

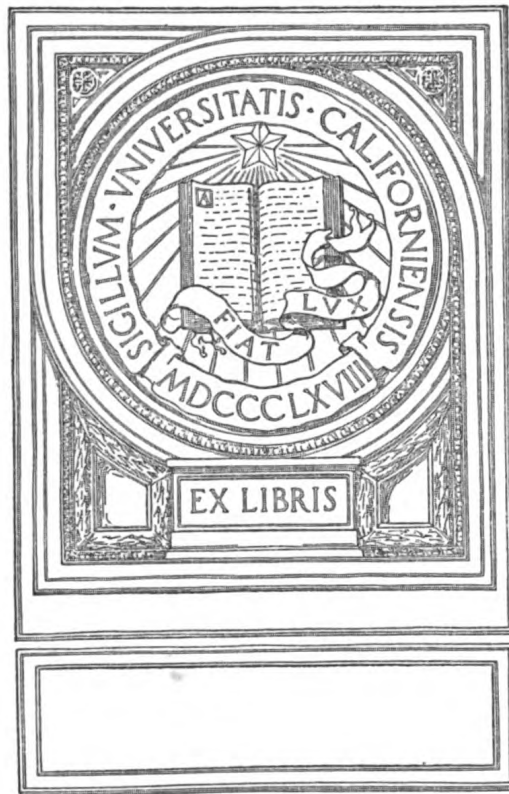
UC-NRLF



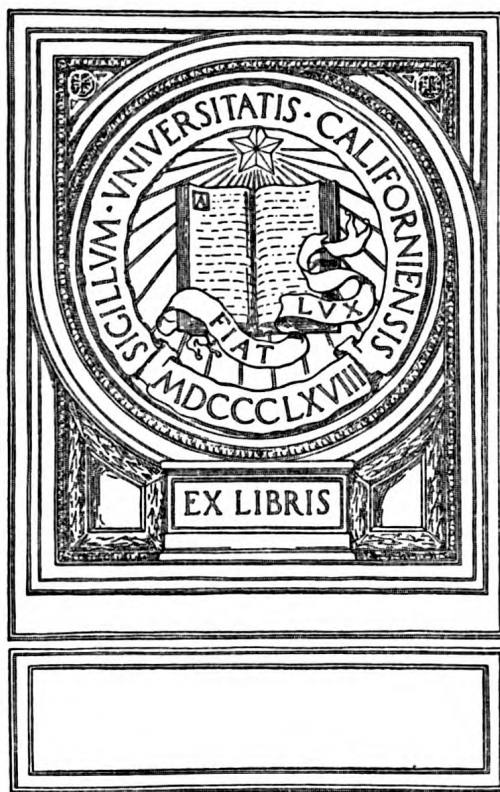
B 3 125 019

HE'S IN THE SIGNAL CORPS NOW

BY CARL MANN



HE'S IN
THE SIGNAL CORPS NOW



HE'S IN
THE SIGNAL CORPS NOW

HE'S IN
THE SIGNAL CORPS NOW



Walkie-talkie is the name given to the portable sending and receiving radio which each of these boys is using. An important part of Signal Corps training deals with the use and repair of these unusual-looking devices.

HE'S IN THE SIGNAL CORPS NOW

•
By
CARL MANN
"

UNIV. OF
CALIF. LIB.

ROBERT M. McBRIDE & COMPANY

New York

1913

U/G 573
M/3

HE'S IN THE SIGNAL CORPS NOW

COPYRIGHT, 1943, BY
ROBERT M. McBRIDE & COMPANY

PRINTED IN THE UNITED STATES
OF AMERICA

FIRST EDITION

TO VIND
ALL RIGHTS RESERVED

DEDICATION

IN THIS humble effort to pen a word-picture of the Signal Corps I sincerely hope that some semblance of the courage and gallantry displayed by the men of the Corps is given true reflection. Ever alert for opportunity to answer a call far above and beyond that of duty, few men in any branch of the armed forces perform more heroic tasks with greater devotion. To them, this book is dedicated.

CARL MANN.

Washington, D. C.

M201549

ACKNOWLEDGMENT

To THOSE who contributed so generously of their time, volunteered suggestions, and provided data and photographs, I am deeply grateful. Therefore, I extend this token expression of appreciation to Lieutenant Colonel C. J. McIntyre, Captain Don Moore, and Lieutenant M. M. Carothers, Special Activities Branch, Office of the Chief Signal Officer, War Department; and Captain Spencer M. Allen, public relations officer, Fort Monmouth, New Jersey.

C. M.

CONTENTS

I. Meet the Signal Corps	11
II. Home of the Signal Corps	23
III. He's in the Signal Corps Now	35
IV. Combat Soldiers Are Trained	49
V. Specialists Made, Not Born	60
VI. Officer Candidate School	74
VII. Men, Words and Wire	86
VIII. Radio at War	97
IX. Action! Camera!	112
X. He's in the Movies Now	125
XI. Station W-A-R Calling!	136
XII. Messengers with Wings	150
XIII. History of the Signal Corps	158
XIV. The Signal Corps Looks Ahead	188

HE'S IN
THE SIGNAL CORPS NOW

MEET THE SIGNAL CORPS

DOWN THROUGH THE years we have been taught that the Greeks had a word for it. Be that as it may, the Signal Corps soldier has four words for it. Potent words—vital words: “Get the message through!” That is the Corps’ motto. Literally, it means exactly what the Signal Corps does. It gets the message through, and often in spite of “hell or high water.”

When a soldier joins the Signal Corps today he is in for plenty of action. And that, strangely enough, is contrary to what he may have been told often about this virile and expert branch of the Army. Somehow, through the years the story has grown around the Signal Corps that this branch is one which has escaped the rigors of shot and shell and missed much of the show simply because a Signal Corps soldier’s job has been a practical job. But in today’s war the responsibility of getting the message through entails dexterity, devotion and danger of every variety. The truth of the matter is he is likely to be in the front line first and last. Regardless of whether an Army travels on wings, wheels or its stomach, it can’t move until the commander gives the signal.

The commander won’t give the signal until he has in his hands combined intelligence reports on enemy strength, terrain and the effective positions of his own scattered forces. The intelligence reports reach him over communications lines via telephone, radio, camera or other Signal Corps device, instrument or message con-

TO VIBU AIBAGTILLES HE'S IN THE SIGNAL CORPS NOW

veyance. Thus there is no escape from the Signal Corps, either at the front or behind the lines.

Praises have been sung to the high heavens extolling the virtues of our fighting forces. Tanks, guns and planes have become endowed with individual personalities. Men in certain of our arms and services are looked on as virtual supermen. We have given them such names as rangers, paratroopers and armoraiders—names which strike the popular fancy and stir up a new enthusiasm for a grim fight to the finish. We surround each of these separate branches of our armed forces with an aura of romance emblazoned with rugged courage and daring recklessness. Americans have a weakness for speed, for the novel, the new and the glamorous. Once a new facet of war is brought to the public gaze and strikes a popular chord of imagination, we are apt to let imagination run rampant. With each of our new arms thus far developed or revamped, nothing has held back our undaunted praise and clamor for more and more of its story. The Air Force has rightfully come up with its share of public acclaim. The Armored Force with its tank destroyers and its vicious metal monsters have been welcomed with open arms. We have worshiped at the feet of the paratroopers and the amphibian forces. But while our enthusiastic acclaim of these fast-growing fighting arms has been going merrily along, the Signal Corps has quietly and modestly been performing one of the toughest and most complex jobs of the war, and doing it gallantly.

The well-kept silence in the Signal Corps ranks stems from the fact that one of its most vital missions is to guarantee security for all information transmitted between our arms and services, our sea and air fleets, and our Allied armies.

The easiest way to grasp the magnitude of the Signal Corps function in this war is to imagine the world enveloped and suspended in a net. The crisscrossed lines of the net are the strings of communications which reach to every corner of the globe. These com-



No action photo better symbolizes the Signal Corps. Here telephone wires being strung forward to Command Post in simulated gas attack are backed up by Walkie-Talkie radio operator in rear. If one communication is knocked out, the other carries on.

munications lines are all maintained for the Army by the Signal Corps. They reach from headquarters in Washington to every single command post where an American soldier stands guard or fights. Men in the Signal Corps uniform responsible for this gigantic task number more than were in the entire U.S. Army in 1939.

Today one single field army moves in complete coordination over hundreds of square miles in one operation. In the air and on the ground, regardless of the many varied and complex types of fast-moving mobile equipment and regardless of the size of the terrain or its character, the Army fights as a synchronized unit. Every single piece of equipment and battalion is linked with the supreme commander on the field. Through light beams, rockets, flares, teletype wires, radio waves, pigeons and couriers, the Army is knit together. These many instruments, mechanical devices, expert soldier operators and technicians, are the links of the Signal Corps communications system and the Army's nervous system.

Commands for action, reports of losses or news of successes in battle sweep over this system at the speed of light. Urgent messages, secret messages—messages which if picked off by the enemy spell disaster, but which are winged victory when delivered safely to proper hands—riding radio waves, dart a thousand miles, skip an ocean or girdle the globe in reckless abandon for either time or space. This is a far cry from the lowly wigwag system invented by Major Albert Myer, the first Chief Signal Officer in 1860. At that date, transmission of code by wigwag signals was considered revolutionary, and a race was begun to speed up the tactics of warfare to keep pace with the forward jump of communications. Shortly after the wigwag came the telegraph, and the race has not yet been won; for nothing yet invented in the way of weapons can approach the speed of messages hurtling over wires and through space. Thus as warfare on the ground and in the skies becomes faster and faster, every instrument

invented is forced to link itself closer with every new development in communications.

Therefore, to serve the Army, deployed in more than sixty-five fronts in global war, the Signal Corps operates a communications net which includes thousands of miles of transcontinental and oceanic wire and cable. Add to this huge network more than 300 radio stations, and it outstrips any organization ever set up for verbal exchange of information.

The Signal Corps barometer began to rise in 1917 when it straddled the whole of France with a telephone line from Luxembourg to Brest and first harnessed radio to war. Under command of Major General Dawson Olmstead, the Signal Corps is now spending something like \$5,000,000 per day to develop and produce the new instruments required to maintain Army communications.

The miracle men of today's Signal Corps are the same towheaded kids, who only yesterday, it seems, were tinkering with broken clocks, batteries, copper wire, steel springs and home-made radio sets, in basements, attics and woodsheds. Almost overnight they have grown up from amateurs to experts. In tribute to these youngsters who have turned out the lights in their radio "shacks" and silenced their amateur sets to wear the uniform with the cross-flagged insignia and to do their part on the battlefields of the world, no words are eloquent enough. Perhaps when victory is won there will be a new respect for the hobbies of kids who "wire up" dry-cell batteries and experiment with all of the electric gadgets in the house simply for the sake of seeing what makes them tick.

Since much Signal Corps equipment and some details of its training are so vital and secret in character, and since few stories about this branch of the service are told, there is reason to believe that many casual students of warfare and tactics often lead off with the popular notion that the Signal Corps is an organization of adventure-some cameramen and photographers. Although nothing could be

further from the truth, we shall attempt in another chapter to describe this phase of the Signal Corps job with a perspective fitting to photography's place in war.

It is true that many Signal Corps soldiers are fighting on all fronts with cameras, but that phase of war fits vividly into a scheme far more deadly than one of simply getting pictures of the war for future generations to thumb over in the front parlor of 1960. Neither are these courageous Signal Corps fighters out to ring up reels of fascinating war movies which we can watch from snug, safe theater seats far back of the battle lines.

It is almost a paradox that the popular notion should be circulated that the Signal Corps' function in a fighting Army is to make exciting pictures of battle action which can be shipped home to satisfy a mass curiosity. Early in 1943 a "motion picture" controversy reared its head in the stately halls of Congress. The Signal Corps was raked over the carpet for its diligent and progressive strides in the matter of making motion pictures at the front where fighting raged.

In its own plodding style Congress usually gets to the bottom of a situation in due course. In this case if the bottom was reached little was said about it. If the true story of motion pictures and the Army Signal Corps had come to the fore, it would have resolved itself into brief but potent facts. Films taken at the front have enabled the Army to step up the training of troops from 30 to 60 per cent. Moreover, films are life-savers. With the aid of these films, a soldier training at home has the opportunity to learn from the mistakes which perhaps have taken the lives of those who reached the front lines before him. Through these visual aids, all soldiers—not Signal Corps men alone—are trained faster, better and more efficiently.

At the moment, as the motion picture controversy dies away and the Signal Corps rolls along with its task of keeping open the long lines of communication through the camera, radio, telegraph and telephone, one is reminded of a sequel to the many camera stories.



Observing an air action these two Signal Corps soldiers on maneuvers might well be in New Guinea, or on Alaskan mountainside. Field observer uses Walkie-Talkie to relay observations back to rear echelon headquarters.

During World War I and afterward, not a few stories circulated about the Corps and its pigeons. So many of these stories, true and otherwise, crept into the columns of newspapers, magazines and books that the Signal Corps in World War II is rightly somewhat gun-shy at the mere mention of these stalwart feathered friends. Pigeons are still in the running, however, and they are flying high and often where the battle fire is hot and heavy. But more about that will appear in a later chapter, which will try to present this gallant little flying warrior in his proper important niche.

Generals, as a rule, do not excel at writing or talking. Their business is training fighters, and leading them once they are trained. But the words of one general stand well with the Signal Corps, for the general's remarks speak volumes about the duties of the men who are the Corps. The date was September 1, 1942. The scene was Camp Polk, Louisiana, where Major General W. D. Crittenger, commanding general of the 3rd Armored Corps, addressed officers and men of the 3rd Armored Signal Battalion as it was activated.

"On its day of activation, this organization faces a definite challenge," said the general. "It is one thing to install and operate a radio under ideal conditions and with all known facilities, in a sound-proof room, shut out from the weather, darkness and all disturbing noises.

"It is something else again to set up a radio in a fast-moving tank, and then make it work night and day, rain or shine, and over rough terrain, to the tune of a 400-horsepower engine and cannon fire, all confined to the restricted space inside the hull of the iron monster.

"Again, it is one thing to set up two telephone centrals 50 miles apart, and, utilizing every new mechanical device and tool, run a wire between them, hung on carefully placed poles, equipped with all insulators, accessories and the like.

"But it is quite another thing, however, to run 100 miles of telephone wire, over hill and dale, across country, under cover of darkness, and then have the lines shot out, run over by tanks, and cut,

almost as fast as you unreel it; and this all to be followed by another 100-mile line or two, laid down the next night—and the next.

“From this it can be seen that not only is technical experience essential, but also a great determination to accomplish the objective in spite of all obstacles, and a fierce dedication to duty that knows no compromise in darkness, ice or snow, or in battle.

“Your first duty is to train yourselves in Spartan simplicity and in the physical and mental toughness which is requisite for victory in modern war.” Thus did the General reveal to the new Signal Corps soldiers something of their rôle in the Armored Corps and the war to come.

“During the past five years,” he continued, “the Army has undergone great strides in modernization. If it were possible to select the headings under which this has been accomplished, we might list four: aviation, mechanization, motorization and communication. In the development of the first three—aviation, mechanization, and motorization—the last—communication—is inextricably woven.”

Before this story of the Signal Corps unfolds it is interesting to look at its framework. In order to meet the demands of pressure in lightning-like global war, Secretary of War Henry L. Stimson, early in 1943, tightened the bolts of the Army machine. There have been minor shifts and a change in the name of a bureau here and an office there since that last major reorganization, but outside of the Air Force no far-reaching revision. The Army was divided on a functional basis. There were three units as the result—the Army Ground Forces, Army Air Forces, and the Services of Supply—all operating under the Chief of Staff General George C. Marshall, responsible to the Secretary of War. The Services of Supply have recently been given a new name—the Army Service Forces.

The Signal Corps is a part of the Army Service Forces, under command of Lieutenant General Brehon B. Somervell. As organized and directed by the Chief Signal Officer, Major General Dawson Olm-

stead, the Signal Corps is divided into four services corresponding to the job each has to do.

The four services are: (1) Signal Supply Service; (2) Army Pictorial Service; (3) Army Communications Service; and (4) Signal Operations Service. The functions of these four branches are development and procurement of communications equipment for the Army, producing pictorial history and teaching films, maintaining communications among Army establishments and getting the message through in combat areas. For administration of these various units the Executive Control Division, the Communications Coordination Division, the Directorate of Planning and the Directorate of Administration were set up. The job of the Communications Coordination Division is to keep the Corps in tune with newest commercial developments and to look after the liaison with other services which use communications equipment. The four services are themselves divided still further into twelve operating divisions, and the operating divisions in turn are branched out into numerous other branches.

When the Army is in the field the Signal Corps' job takes on a highly interesting and complicated flavor. It is responsible for the installation and operation of communications equipment down to and including the regimental echelon, and laterally to adjacent units of the same echelon. Assault or forward units use equipment operated by their own personnel, but procured by the Signal Corps. A division Signal Company is attached to each divisional headquarters. An Army Corps headquarters has attached to it a Signal battalion, as has the Armored Corps.

This breakdown of the various units and their assignment to each of the Army branches has a purpose. The Signal units are assigned to carry out specific missions and are particularly trained to meet the requirements of that branch. A branch's mobility and the nature of its operations determine the type of signal unit attached to it.



The Handie-Talkie set, successor to Walkie-Talkie radio, is fast displacing its predecessor. Compact, simple to operate, it provides two-way conversation over short distances. A midget in size, it, too, is link in Army communications net. Observer here is on reconnaissance patrol.

A field army is allotted a headquarters signal service company, a construction battalion, an operations battalion, a radio intelligence company, a depot company, repair company, pigeon company and a photographic company. Held in reserve, a field army normally will have in addition to these Signal units, troops which can be brought up as reinforcements.

HOME OF THE SIGNAL CORPS

NOWHERE IN AMERICA does the "tree of scientific knowledge" bloom forth in greater profusion than at Fort Monmouth, a scant hour's train ride from the hum and roar of war-bound Manhattan. As a military post, it is one of the oddest and most striking collections of people, soldiers, artists, gadgets, instruments, buildings and stages yet assembled on one stretch of God's green acres.

Fort Monmouth first made the headlines when George Washington directed the Battle of Monmouth on the site in the Revolutionary days. Intermittently the spot has added flavor to American history ever since. Fort Monmouth, as it is now known, was originally Camp Alfred Vail, founded on May 16, 1917, with the first eruptions of World War I. The first contingent of troops arrived from Fort Sam Houston, Texas, on July 9 of that year. From its birth, the post has been a Signal Corps Center, though some of its buildings closely resemble those of the Air Force training stations. The hangars were built during World War I and served to house some of the first aircraft ever marshaled for military service in our Army. This was because, as is now almost forgotten, the Signal Corps is the father and parent of the Air Force. The first aviation in the Army was known as the Aviation Section of the Signal Corps. It has since grown into a robust and healthy offspring.

The old hangars still standing at Monmouth, somewhat faded and a trifle weather-beaten at the seams in places, have been cut up

by partitions and floored for classrooms, workshops and storerooms.

Located on what was formerly Monmouth Park, the post is now beautifully landscaped. One writer has compared it to a college campus. With a few ivy vines and a little stretch of the imagination this amazing place would look just that, for its walks are sprinkled with civilian employees of the Signal Corps, marching to and fro with books, papers and brief cases. And some of the employees are New Jersey's prettiest high school and college girls who are serving the Army at the giant training center. They fill clerical, semiskilled and technical jobs. More recently there has been a slight tension in the atmosphere at Monmouth because of the encroachment of a few comely representatives of the Women's Army Auxiliary Corps. When the Public Relations Officer at Monmouth, tall, handsome Captain Spencer M. Allen, learned of the coming of the Waacs he was a trifle disturbed. "How will I send one of these Waacs to interview soldiers in their barracks?" he grinned. The officer was thinking of the post's camp newspaper, *The Message*, which does a thorough job of reporting the goings and comings of this amazing Signal Corps Center.

When the present war emergency arose, the spacious golf course at the center was leveled off and dotted with temporary barracks. This spot became the Replacement Training Center. Soldiers came in by the thousands to learn their Army Communications jobs, and the place literally overflowed. The Officer Candidate School at Monmouth needed room. The result was that two sub-posts were designated to become a replacement training center in two sections. One was located at Camp Edison, Sea Girt, New Jersey, a few miles nearer the coast; the other was surveyed at a place several miles inland by taking in some farm land and "A Lair," the estate of the late Arthur Brisbane, who had given it over originally to the state as a park. This second camp is now known as Camp Charles Wood. Thus Monmouth now, with its two sub-posts, comprises an area of

Thousands of young women, like this attractive Miss employed by civil service, aid Signal Corps engineers and technicians in testing radio sets and communications instruments at Signal Corps laboratories and at Ordnance Testing and Proving Grounds. Here one of the newer frequency modulation radio sets is being tested.



All civilian laboratory workers for Signal Corps are fingerprinted, and personal histories combed. Instruments they work on are closely guarded as are their secrets. Instruments developed in laboratory go to battle front and are delivered as surprises to the enemy.

several thousand acres scattered over many square miles of the New Jersey coastline.

The Post Headquarters at Monmouth is on the original post, about a quarter of a mile from a whistle-stop on the New York to Long Branch railroad run. The station, with its few scattered residences, a store or two and a service station, is called Little Silver. The nearest soldier haven of any size off the post, except New York City, some fifty miles away, is the teeming little city of Red Bank, a short bus ride from headquarters. The railroad bounds Monmouth proper on the east, and U.S. Highway 35 is generally accepted as the western boundary, although Camp Charles Wood has now spread far beyond that.

Fort Monmouth is the hub of Signal Corps training for the entire U.S. Army, aided by at least a half-dozen scattered posts, subposts and training centers, laboratories and film centers, adjacent to Monmouth itself and at other widely separated points across the country. During 1942 the pressure on the Signal Corps reached such proportions that additional training centers were set up at Camp Kohler near Sacramento, California; Camp Crowder, not far from Neosho, Missouri; and Camp Murphy in Florida. Camp Murphy is the training center for troops assigned for Aircraft Warning Service.

Monmouth's official title is the Eastern Signal Corps Training Center. Under that heading comes the Post Headquarters, which handles the administrative functions. The center is further divided for training purposes into the Replacement Training Center, which includes, as previously explained, Camp Wood and Camp Edison, whose functions are primarily for basic training and preliminary wire and radio training.

Under the other wing of the Post Headquarters comes the Eastern Signal Corps School, which is divided into three parts: the Officers' School, where officers detached from other arms and services study

special courses in Signal Corps operations; the Officer Candidate School; and the Enlisted Men's School.

The Enlisted Men's School is further divided into divisions, called Wire Division, Radio Division and Teletypewriter Division. These divisions within the schools are themselves divided into smaller sections, such as the Code and Traffic Section of the Radio Division, and the various repair and maintenance sections. This careful and systematic division reflects the highly specialized branches of training. It tells, too, some of the story of a specialized, scientific war, for few vacancies can be filled anywhere in the Army unless by a specialist or a soldier skilled almost to professional perfection. Officers at the Signal Corps Center explain that approximately 70 per cent of all Signal Corps personnel—and they number many thousands—are highly skilled specialists. The other 30 per cent do not stay in the Signal Corps unless they are capable of grasping a general knowledge of some specialty within the framework of the Army's vast communications network.

It takes liberal dashes of superadministrative skill to keep the wheels of this Signal Corps Training Center whirring at war speed. In 1943, as winter turned to early spring, there was an air of tenseness over this giant training area. Everywhere soldiers, in the classrooms and out on field problems, were digging in. A casual survey of the post left the feeling that these men knew their every move was a step nearer a terrific outbreak on the battle fronts which could mean either a total and complete victory soon or one of the worst drawn-out conflagrations of all time.

Normally around an Army camp there is frequently a show of horseplay and a note of adventure in swinging through routine drills, maneuvers, classes and occasional passes to the nearest town "hot spots." But these were noticeably absent at Fort Monmouth in the spring of 1943.

These men at Monmouth pore over books and papers, studying all types of machines and electronic devices, writing the answers to long and complicated examinations and polishing off their skills in telephone, radio and other instruments of communications. Tooth and nail is the way they're going at it.

At Fort Monmouth they get the cream of the soldier crop to be trained for the ultimate job of "getting the message through." Just how many thousands come off the military assembly line each few weeks is secret, of course, but the figures would be startling. That, however, is of no particular concern except to the Axis hammering at our vital battle-line communications systems. What is important and at first a little puzzling, is that war requires the collection of so much of science, grit, determination, wires, radios, telephones, cameras and capable people, all in the interest of mass destruction. If this same talent and equipment and these training facilities were applied to the pursuit of peacetime communications projects, they would virtually set the world on fire with startling discoveries and advancements of science.

The raw materials fed into this modern training mill come from the farms of Michigan, the beet ranches of Colorado, the lettuce and celery ranches of California, the studios of Hollywood, Manhattan stock exchange desks and Texas oil fields. They come to Monmouth and the other Signal Corps training centers because they have some aptitude for the many complex Signal Corps requirements.

If one looks for something inspiring or exciting at Monmouth or its subposts, one finds it in the spirit of the men and their attitude toward the job they're doing there. For the most part the buildings are all of usual cantonment type construction. They are long, low, generally quite barren, except for bunks, benches, desks or work tables. These buildings are comfortable enough but they do not boast any luxurious furnishings, for they are designed to teach sol-



A few of the thousands of civilian employees who keep administrative wheels turning for the Signal Corps Research Laboratories.

diers to lead lean, vigorous and efficient lives while they wear uniforms. The buildings, whether they serve as offices, living quarters, kitchens or mess halls, are always clean and neat, with the ever-pervading atmosphere of army efficiency predominant.

The winters at Monmouth are bitter and cold. It is the damp, penetrating cold of the North Atlantic coast, for Monmouth is only a few miles from the ocean. The summers are not so bad, but are sufficiently warm to make soldiering a not too pleasant task for the man who earned his livelihood before in an air-conditioned office on Broad Street or Wilshire Boulevard. But the cool, refreshing breezes that come in along the Jersey coast ease the sultry atmosphere of the Jersey summer, and the bustling beehive of radio engineers, technicians and wire experts at the training center are able to work through the most rigorous of schedules month after month.

Long ago the Army decided that relaxation was important at times to the soldier. To that end Monmouth has provided well for Signaleers. The Service Club at Monmouth is not a pretentious building, but it is generally crowded from dawn to taps. The post proper is divided into areas corresponding to letters of the alphabet, in typical Army style. The Service Club is adjacent to Area "B," near the headquarters. It boasts a lounge, restaurant, information service, pool tables, writing facilities, beverage bar and music room. Dancing is a popular pastime there on Friday and Saturday nights. On Tuesday and Thursday nights some type of recorded or instrumental music furnishes the entertainment. Wednesday night is bridge night for those who have a leaning that way.

Near the Service Club is a small park with picnic facilities available during the summer, with an occasional band concert by the post band. Motion picture theaters, too, are nearly always open during the afternoon and evening. There are two of them to accommodate the many thousands of troops in training at the post. Frequently the theaters vary their bills with a visit by a famous

concert artist, name dance orchestra or variety show from Manhattan.

Several halls are set aside on the post for recreational purposes. On certain evenings they become the center of social festivities. Often there will be a free movie, dancing, "juke-box" record sessions and game nights. The halls are also equipped with pool tables, ping-pong tables, shuffleboard and writing facilities. Many impromptu types of entertainment are arranged for the men, to ease the tension of the intense training grind. All activities at the recreation halls are closely supervised by the post Special Service Officer and the chief hostess.

The guest house at Monmouth is probably one of the hardest Army hotels in the country to get into, for reservations have to be made days and often weeks in advance, especially for the weekends. Presided over by the chief hostess and her assistants, it provides accommodations for the parents, sisters, or girl friends who want to visit their soldier sons, brothers and sweethearts. It is a beautifully decorated building with a homey atmosphere unlike that of the other trimly efficient quarters at the post. Rates are \$.75 a night per person.

The Army is proud of its guest houses in camps from coast to coast. At these convenient places a soldier's parents or relatives may visit with him at leisure during the soldier's hours off duty. When the parents visit the post they have an opportunity to realize more fully that their son is not the only son away from home. Also, the parents get a first-hand view of life on an Army post, which somewhat eases the sting of a son's absence from his own fireside. This parental look at the generous amounts of food served to the soldier, the cleanliness of his quarters and the orderliness of his daily routine, his companions and other aspects of the son's life is comforting to any mother or dad.

The Signal Corps Message is the camp's top newspaper. It gathers and prints all the news that's "fit" and prints it in colorful soldier

language. It boasts feature writers, staff artists and photographers who've done stints on country weeklies, big city dailies and slick paper editorial desks, from the Atlantic to the Pacific. But the soldier is first a Signal Corps soldier, and his reportorial duties are extra-curricular assignments, unless he happens to be one of the chosen few assigned to the public relations staff.

The post is so large, however, that several other publications are issued, reeled off by soldier penmen to keep their uniformed readers informed. The *Fort Monmouth News* is a daily bulletin containing official notices and recreational and personal items pertaining to the entire post. The *Sea Girt Sentinel*, published by the Camp Edison Special Service Office, serves as a thrice-weekly bulletin of Edison's activities. The *Broadcaster*, published by the Camp Charles Wood Special Office, "contains a complete list of 'What's doing' on all three Signal Corps Training Center posts." In addition, another star publication among the many thousand troops is the one called *Chapel News*. Also under the Special Service Officer's wing is a printed weekly schedule of activities at the various chapels on the main post at Monmouth and the subposts at Camp Wood and Camp Edison.

Thus there is no complaint at Monmouth about soldiers not being well informed. They inform themselves through their own medium of the soldier's free press. The editors of these papers don't lose a great deal of sleep over circulation problems. They know that new subscribers will move in when the old readers go to Africa or Australia. One soldier editor, when queried about the editorial policy, explained that it was strictly "GI," and "no politics are involved." Thus the presses roll at Monmouth. The spirit of these little publications reflects sky-high morale. Their bright, gossipy style tells the soldier in his own Army vernacular the dramatic story of the fascinating place in which he girds for war.

Soldiers with literary tastes find plenty of light or serious reading



A giant M-3 Tank at the Signal Corps General Development Laboratory gets a radio set installed. When possible, women trained as expert technicians assist with such installations, thus leaving men free to join the Signal Corps on battlefield.

at the post's well-stocked library. Hundreds of books on virtually every subject under the sun are available. The main library at Monmouth, staffed by efficient librarians, serves the subposts by means of deposit stations.

On Monmouth's Oceanport Avenue a post gymnasium is open daily from 9 A.M. to 10:00 P.M. The gymnasium has facilities for boxing, basketball, handball, calisthenics and other conditioning apparatus. Each camp attached to Monmouth has a spacious athletic field for competitive sports such as baseball, football and track and field events.

The Signal Corps soldier who trains at Monmouth is fortunate in the matter of transportation. Buses and trains provide almost hourly schedules day and night. An hour's train ride (a little longer by bus) and the soldier is in New York, from which he may find transportation for virtually any point within the United States, whether by bus, train or plane. Thousands of Signal Corps men visit New York for the first time on a sight-seeing tour after arrival at Monmouth. Nearly all trainees are required to spend the first four weeks at the Replacement Training Center before a pass is granted for a trip beyond the limits of the post boundary.

Chapter Three

HE'S IN THE SIGNAL CORPS NOW

BEFORE THE WAR THE Army was working out the system by which special aptitudes of the citizen soldier could be judged. The Army got together the best of the psychologists, sociologists, vocational guidance experts and other students of the brain and brawn of homo sapiens and drew up a pattern. From the pattern they organized and framed written and verbal test systems. When they finished with this scientific and complicated process for screening potentialities of the prospective soldier, recording and classifying them according to the needs of the Army's many branches, they called it the Army General Classification Test.

When an inductee, trainee, draftee, rookie, or whatever he chooses to be called, gets through this test it is pretty generally agreed that the Army will put him where he will deliver the most with his combined natural talent and intelligence.

Before recruits get to Fort Monmouth, Camp Crowder or Camp Kohler they have been through the reception center, where they have encountered the General Classification Test, which is now so keenly organized and administered it might even be called painless.

One of these reception centers is at Fort Dix, New Jersey. There new soldiers fresh from "civvies" line up at one of the buildings which is called, for lack of a better name, a hopper. A steady line of recruits files through. They are checked, weighed, measured, questioned mildly, looked at and through, scrutinized and analyzed—

all scientifically, mind you. Finally, after a shower, they get into a uniform. It is then that they find a seat in one of the hopper's large rooms to wait a turn with one of the sergeant-interviewers at a desk.

Once up to the desk, the new soldier, whether he knows it or not, is really in the Army. The next few words he speaks, plus what he will write on a sheet of paper that has a host of questions on it, will largely determine whether the soldier will spend his days in the Army firing an anti-aircraft gun, driving a truck, swinging a pick, or operating a radio set at a command post in New Guinea.

The sergeant gives the recruit a quick once-over in smooth, businesslike fashion. He is practiced at this business. Several thousand soldiers have passed his desk, and this new man coming up is just another one. But the sergeant is as skillful in this classification job as a surgeon performing a brain operation. He knows just what questions to ask and why. And he operates with a verbal rhythm—impersonal, yet kindly and sympathetic. He knows the name of the new man coming up, for he has already seen a card bearing his name and serial number.

The sergeant proffers a pleasant but mechanical greeting. "How are you, John?" he inquires as the recruit seats himself across the narrow desk. "Fine, so far!" he grins, somewhat eased at this gentle opening of his first Army quiz. The sergeant comes right back with a question in a subtle yet measured tone. "By the way John, what's your dog-tag number?" If the recruit's brain is hitting on all cylinders he'll respond with a number which probably reaches six or seven digits. These are the numerals of an identification disk which the recruit is supposed to have memorized already. And this quick mental dart at the number is one of the sergeant's little psychological tricks to get at the mental alertness of his human puzzle—for each man is a puzzle until his qualifications, past experience, education, personality and physical structure have gone through the measuring processes.



The "WIRES," adopted name of civil service women employees of the Signal Corps. These young women have even put themselves in uniforms as smart as the Women's Army Auxiliary Corps members. In the foreground is Major Merlin Moody, Post Signal Officer at Fort Bragg.

If ever there was a time when a man should be "true to himself" this General Classification Test presents the occasion. For if the soldier does convey a false set of values as to his mental and physical dexterity he will suffer later. The result will be that he will end up with a complex job which calls for a skill he probably never could develop. It would serve only to retard his advancement, both in training and in rank. On the other hand, a full story of his training, ability and experience in the hands of the Army makes possible the assignment of a recruit to a type of training he can readily absorb and eventually to a job in which he can excel.

With the many thousand young—and older—citizen soldiers yanked from the smooth, easy rhythm of comfortable civilian life, the immediate reaction to the quick, efficient process of getting inducted and slipped into a uniform is generally one of depression and slight bewilderment. There are many reasons for this reaction. Chief, I believe, is the fact that Americans are at heart the most peace-loving people on earth. They may quarrel and squabble and quibble over the inconsequential and trivial, call each other names and bristle at each other in civilian life; but when it comes time to put on a uniform and lay aside everything except what the Army must teach them, it cannot help but go against the grain a little. This is a natural reaction. But this feeling is only a transitory stage. As soon as a new soldier, whether he's to be a Signal Corps soldier or an Engineer, gets through the first few weeks of basic training and into the job he will be required to perform for the Army, he turns out to be a first-class soldier. He takes to his task with a zest and will to learn perhaps unequaled at any other period of his life, not even excepting college or high school training.

In the Army the soldier soon gets to know he's in it for only one reason—to win the war. He realizes that his home and future are the issues at stake. Therefore those Signal Corps soldiers new to the

Army react as do soldiers in any other branch of the service. They know the better they do the job the sooner will come victory and an end to the whole sorry mess.

The first thing in the Army that gets under the new soldier's skin is a shot in the arm. Several of them, in fact. They squirt fluids into his veins at the Induction Center until he gets the idea that perhaps the doctors are of the opinion he's already got one foot in the grave and couldn't live another week. This, however, is routine and important. The injections are given to protect the soldier's health, and someday in the jungles of New Guinea or the desert of Africa may prevent him from going under with fever or tetanus, or some other illness with which he will undoubtedly come in contact.

Seldom does the recruit spend as much as, or more than, a week at the Induction Center. The General Classification Test puts on the record his capabilities, his mental and physical twists, so to speak. With this, showing what he is potentially cut out for in the Army, and with his immunization record in the works, the soldier during the first three or four days gets accustomed to wearing the uniform. He doesn't salute often, nor is it expected of him. The officers at the Induction Center are aware that the recruits know nothing yet about military courtesy, and they go easy with them.

And in these first few days the soldier learns about something which he probably thought would never trouble him. He learns how to make a bed. For there is an art to this business. As long as a soldier remains in a training camp on this side of the ocean he is going to be harassed and much annoyed about this little problem of making beds—which are really cots, and are called bunks. He learns that nearly every sergeant and every company commander has his own idea about how a bunk should be made. The corners of the blankets must be tucked in just so. The pillow must have that fresh untouched look throughout the day, for the barracks lined with cots is subject

to inspection at any hour of the day after 5:45 in the morning. During the first few weeks of the recruit's life the bunk becomes an important piece of barracks furniture in his mode of living.

At the Induction Center the Signal Corps recruit gets a lecture on the Articles of War. These will be the rules by which he lives for the duration and six months after, or until he leaves the Army. He sees films which depict by means of dramatic action and the spoken word the story and meaning of the Articles of War. The soldier is told that these Articles are designed for his protection as well as to make the Army a workable piece of machinery. Another film he is shown is one about venereal diseases. This film forcefully etches in the soldier's mind the necessity of guarding his health every hour, and its importance to the Army.

There is little or no drilling at the Induction Center. But the soldier is instructed in military courtesy, which includes the rudiments of saluting and addressing superior officers and how to conduct himself at all times as a gentleman and a soldier. The recruit is also told how to shine shoes, and the importance of keeping them so, how to care for his clothing and personal belongings. This art of shoe-shining becomes something of a drama after some weeks in the Army. New recruits can often be found on bunks discussing the best grades of shoe polish, the most effective types of polishing cloths and the best shining stroke.

With the first three or four days over, the new soldiers are still a little puzzled by some of the instructions they've received, and a little bewildered at the painstaking attitude of the sergeant in all details, no matter how trivial. This even extends to the matter of throwing cigarette butts on the floor, or carelessly dropping a wadded chewing-gum wrapper on the front step of the barracks. Right off the new soldier becomes aware of the necessity for careful attention to detail. If he is alert he will find that the man who attends scrupulously to all details of any assignment, even to that of emptying



Three pretty "WIRES" pause for the cameras in the midst of Signal Corps duties as expert radio assembly and repairwomen. The three jobs they hold may have been vacated by three Signal Corps soldiers now in England, Australia or the Aleutians.

garbage pails, or washing pots and pans, will make steady progress in the Army.

The spell at the Induction Center is soon over, and one day the recruits are mustered out for roll call. Names are called by a sergeant, and fifty or a hundred rookies step forward. They are off to the Signal Corps Replacement Training Center, where they will first begin to take on the duties of a soldier.

The soldier has already learned at the Induction Center that life in the Army is constantly, and nearly always without prior notice, subject to rudest interruption. The interruption may be the occasion for a policing-up detail, which means sweeping the barracks, or assignment to a detail to pick up scraps of paper being carried around the post by a gusty wind.

When the Signal Corps recruit is moved from Fort Dix or some other Induction Center to the Replacement Training Center at Camp Edison, near Sea Girt, New Jersey, life does not change immediately or drastically. He is just beginning to get the feel of his uniform. He is already adjusting himself to Army chow and to getting up at 5:45 A.M. He's also quickly catching on that when a sergeant, or other noncom, issues an order the best and most advisable act is to move as the crow flies—in a straight line to the place of assignment and perform the assigned duty as he is instructed to perform said duty. The firmness takes hold gradually, and the recruit is launched on his Army career.

At the Induction Center reveille was sounded at 5:45, and at the Replacement Training Center it is the same, but it gets easier as time passes. The first day at the RTC the rookie spends getting his clothing stored away correctly in the locker, straightening his personal effects and putting them in order, and getting himself assigned to barracks and a bed.

The first day may include a talk by the company commander. He probably will say, "You men have been chosen to 'get the message

through.' You are especially picked men for a special job." Which is the unvarnished truth. All men sent to the training center have been judged fit for Signal Corps training because of special aptitudes which stood out in the General Classification and other tests. Other aptitude tests will be given at the RTC to determine further which of the hundreds of specialized jobs in the Signal Corps these men will be chosen to fill.

The second or third day at the RTC, after a hard day out on the drill field learning how to do squads right and squads left and shouldering a rifle, the rookie discovers perhaps for the first time that there are places on the post called "day rooms." These are the soldier's home away from home during his off hours. They are furnished with radios, desks, lounging chairs, magazines, books and newspapers. Here he is free to relax and write letters home or to the girl friend. He can sit here the whole evening until it's time to scramble back to the barracks for lights out, which usually comes at 10:00 P.M.

Getting up at 5:45 A.M. is always one of the most painful items about the first few weeks of Army life, for most of our American life is geared to a later rising hour in the morning. The soldier, however, begins to find that, once out of bed, it is exhilarating after a fashion. After a few days his physical system begins to take on tone, his color brightens up. And he realizes that perhaps the Army will give him back something for his time after all.

At 6:15 A.M. breakfast is served at the RTC. According to authorities and Irving Berlin, it isn't served in bed, nor with the morning gazette. It's served in a long, low, clean mess hall. Right after a prompt and spirited roll call by a husky sergeant who has no respect for names, just clipping them off with the A's first, B's second, and so on, the men fall in and march rather raggedly to the chow line at the mess hall. Some eat rapidly, a few eat slowly, some eat daintily and others manage to get the food down mechanically, as though this particular act was the order of the day. From the breakfast table



This radio-equipped half-track with its 50-caliber anti-aircraft machine gun is a vicious armored force weapon. Its radio will get every conceivable test before leaving the proving ground.

in the mess hall they march back to the barracks. Once more there is a roll call. This is the one at which the men count off and step forward in squads or platoons to be assigned the miscellaneous work details of the day.

"Privates James, Jenkins, Johnstone, Jones," the sergeant reads loudly from a list of names in his hand. "You men step forward." They step out of line. "You men will report to Sergeant Smith at the commissary in ten minutes," the sergeant concludes. The men turn at a command and march off to the commissary, perhaps to stack or move food stores, or load and unload the trucks going and coming.

The sergeant goes on through the alphabet and the men disappear in squads, platoons, and perhaps in groups of three to a dozen men. The system is carefully worked out at the replacement center so that the same man will not be permanently assigned to wash dishes as a K.P., or dig ditches, throughout his full thirteen weeks of basic training. Although there are always plenty of K.P. assignments waiting at the kitchen and plenty of ditches to be dug, a new soldier probably won't get K.P. duty for more than three or four days throughout his first full thirteen weeks. The men are rotated at various work assignments as well as at drill, bayonet practice or calisthenics.

On the whole, the early days at the Replacement Training Center roll off without excitement or complications. A soldier from Syracuse has trouble keeping in step; another from Trenton can't present arms, and probably will never be snappy at it no matter how much the sergeant or corporal cajoles, threats or wheedles—it just isn't in him. That doesn't necessarily mean this soldier from Trenton won't make a crack Signal Corps soldier. Perhaps he has an ear as keen as a tack and an inherent sense of rhythm. He will turn out eventually, after some schooling, to be one of the smartest radio operators in the whole works.

The soldiers are sore and tired for a few days. The marching and calisthenics, in three- and four-hour doses, plus endless instruction

and nosing through regulations and rules, all done to the tune of minute-by-minute check, are enough to have some effect on any man's physique.

Unless sent from another station on detached service for study at Monmouth in one of the special schools, or transferred from another station to train at the Officer Candidate School, all Monmouth men enter via Camp Edison. Edison is the camp to which all Monmouth Signal Corps recruits go for the first three weeks. Here they are thoroughly indoctrinated with basic infantry training, which is virtually the same for all arms and services.

The fourth week is the one which utilizes all the skill and hardening the soldier has managed to acquire from the day he donned the uniform. It is the week during which a soldier gets the first taste of war. It is twenty miles from Camp Edison to the combat course at Camp Charles Wood. That trip will not be by bus or train. It is made on foot. Forced march is the Army name for it—and with full pack. It is the first experience the recruits gets of marching and moving several hundred soldiers in a body except perhaps a review on the drill field at Edison for the Commandant.

Before the men set out on this march to the combat course they get daily drills in rolling packs, pitching tents and detailed instruction on how a soldier lives in the field. This is one of the first interruptions of the barracks life which after three weeks has just about settled down to a definite pattern for most of the men.

The combat course takes in the former Arthur Brisbane estate. When the famous newspaperman lived there the spacious timber-covered acres, threaded by sparkling streams, was known to the nation of newspaper readers. For on the estate near his family residence Brisbane built the famous watch tower which he used as a hideaway. From there he sent out his column, "Watch Tower," read by millions. The watch tower itself looks down on the wild, uncultivated acres now covered with vines, shrubbery, trees and winding trails,



Visiting firemen at the Mid-Western Signal Corps Training Center, Camp Crowder, Missouri, enjoy getting acquainted with the Army's new radio equipment. This visitor with the pleased smile is Congressman Dewey Short listening to a message coming over a Walkie-Talkie.

which for mile after mile are nothing more than cow paths. We wonder what comment this famous newspaperman would make if he could observe the jeeps, tanks, trucks and hundreds of soldiers pouring out across these hills and valleys, practicing for the grimmest war the world has ever seen.

COMBAT SOLDIERS ARE TRAINED

LET NO MAN SPEAK lightly of the Signal Corps soldier as a noncombatant. He knows how to fight. He learns in stiff, hard doses. On the combat course at Camp Charles Wood the curtain goes up on the fourth week of basic training with a rush. After the twenty-mile hike with full pack from Edison, feet are sore, tempers are short, shoulders ache. Uniforms are sweat-soaked, and bodies are tired and strained. These four-week-old soldiers are indeed in a fighting mood. Here on the combat course they get their first bitter war medicine—five days and nights of hellish maneuvers with all of the trimmings of war except the butchery and air attacks. Simulated warfare, the Army calls it. To these young soldiers fresh from civilian life it's little less than nightmarish.

The men are divided into two forces. One contingent is the enemy. Regiments, companies and platoons are organized. They are dispersed into battle formations over the countryside, and the battle begins. Roads are blocked. Command posts are set up. Security patrols streak out cautiously through the hills. Company commanders plan and organize specific attacks on machine-gun positions, pill boxes and other military objectives. The "war" fans out for miles and takes a definite pattern.

The site of this simulated campaign might well be somewhere in Tunisia or on the northern rim of Australia. There are few signs of civilization. When the place was a state park it was threaded by

narrow trails and roads. Now these trails are crowded with wild vegetation, brambles, briars and thickets. The whole area looks as though it had been given back to the Indians. Old ramshackle, deserted houses, ringed by straggly, broken fences are scattered here and there.

Advanced students from Camp Charles Wood's Radio and Wire Division training schools are on the scene with the war gear. They string communications throughout the area from command posts to headquarters. Radio operations go full tilt. At the headquarters, student radio operators receive messages from command posts stuck far away in the hills. They get flashes on the locations of pill boxes, machine-gun nests and enemy patrols. The message may begin with the voice of a soldier on patrol across the brow of a hill three miles away as he speaks into his handie-talkie radio set strapped on his back. Back the message goes through his command post to headquarters. The data and intelligence report are flashed through with all the speed and efficiency required in actual battle. Correct procedures are followed.

One problem may require the silence of all radios in the area. Through special code signals broadcast from headquarters, radios go silent. Signal Corps men in the Wire Division take over with telephone communications. Wires have been threaded along the roads and over the hills and into foxholes. Observers send back reports. Meanwhile enemy patrols, who have no knowledge of the whereabouts of these communications, search them out and attempt to cut the lines. Thus these Signal Corps men learn how to handle all types of communications in the field, as well as all the methods of defense of these same communications lines.

They are told repeatedly the importance of knowing how to protect and maintain these communications, for without them an army is lost. Communications are the first objectives of the enemy. He nearly always stabs at them first. Once he knocks them out, he knows the organization of an army can be quickly disrupted. An



This gun crew was operating a 75-mm weapon two years ago in maneuvers aided by their portable trans-radio set which was contacting its command post. Note the crude appearance of the radio set compared to newest Handie-Talkie shown on other pages. Also note change in headgear.

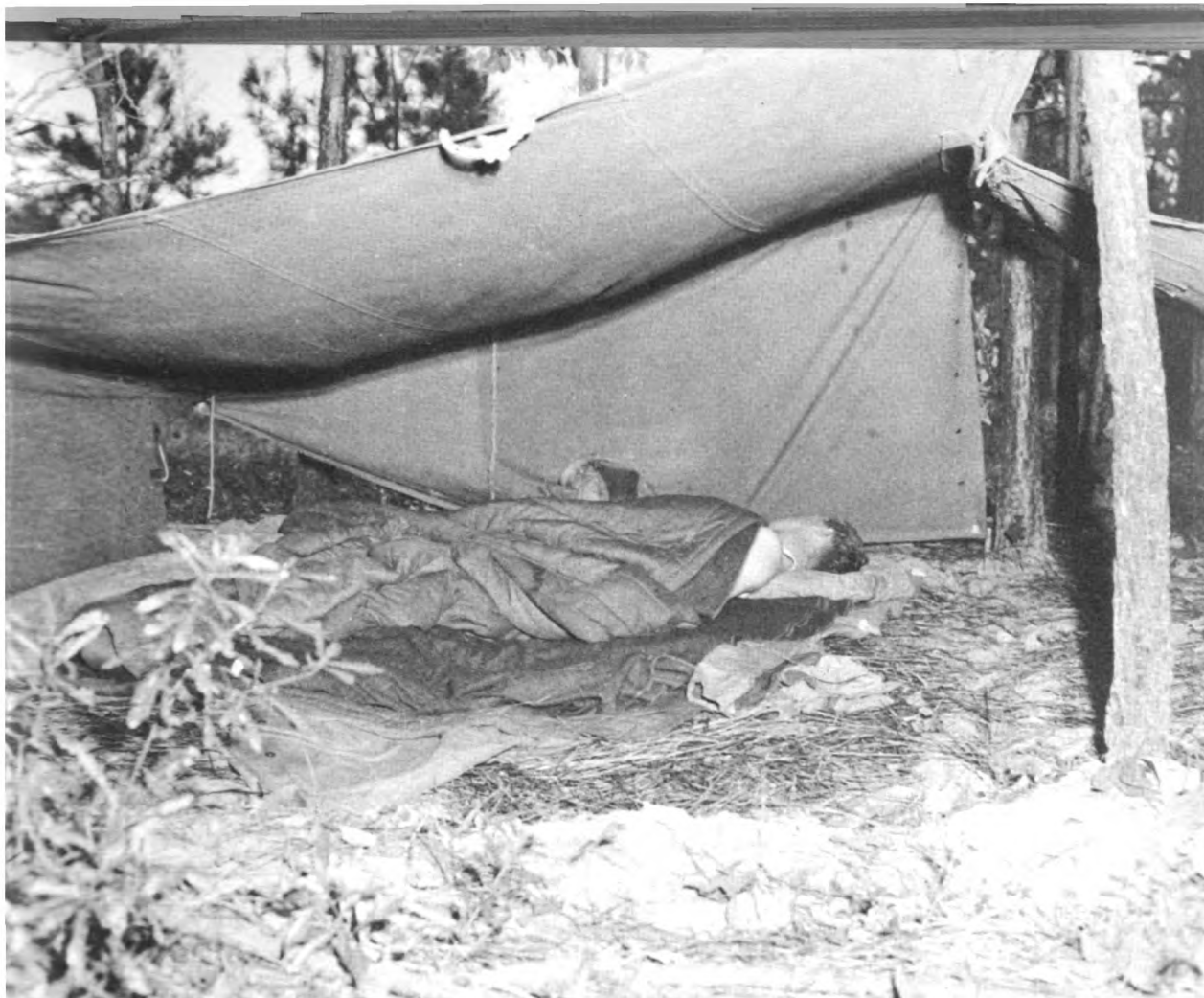
army dispersed over hundreds of miles in small troop units must always attempt to retain contact with its headquarters. The Army is geared to move and operate as a single coordinated unit.

Early on the morning of about the third day of maneuvers three platoons divided into as many security patrols make their way toward one central point marked X on the map. A lieutenant commands each platoon. Day and night these men have been fighting this mock war. They've encountered enemy patrols. There have been captures by both sides. Sometimes there are hot words between the opposing patrols. The men are worn and battle-weary. A few who are not so sturdy are not far from the first stages of physical exhaustion.

The three platoons, inching steadily ahead, finally reach their objective. They surround the machine-gun nest. Now they're down on their hands and knees hugging the ground. Each platoon moves cautiously. The sergeant relays the lieutenant's commands by silent signals. He directs the men by various motions of his arm. The men creep toward the objective without cracking a twig. They've been told that many a man died in the jungle simply because he made the mistake of giving away his position by breaking a branch of a tree, or shuffling through a pile of dead leaves.

Suddenly the patrol on the right lets out a whoop to distract the enemy machine gunner from the patrol in the center and on the left. The machine gun barks, then its staccato chatter breaks into a steady rat-a-tat-tat. The shells are blanks, but the effect on the men is good. They may have been told the shells are blanks, but so far every other act in this maneuver has been realistic and they are a little skeptical. The lieutenant in command on the right gives the signal. The men storm the machine-gun position. As they rush forward to take the gun, huge firecrackers scattered about start popping. These are there to simulate landmines.

After the position is captured the men are brought together in a huddle, seat themselves on the ground and a lieutenant points out



During combat training, recruits get the feel of terra firma. They're outdoors day and night, rain or shine, for several days learning to live under conditions they'll be expected to meet in the theatre of operations. Camp may be broken in middle of the night while men pack and hustle equipment into trucks to establish new communications headquarters up "front."

the errors and explains how the job should have been done. The explanation is clear, concise and to the point.

The hundreds of timber-covered acres in this combat course are divided into special demonstration areas. Each area is marked with a series of war exhibits. These are crude but interesting, and they catch the eyes and ears of every soldier. While the three platoons listen to the lieutenant lecture on the fine points of taking a machine-gun nest, another class is in session at another spot. Down the road about a quarter of a mile some two hundred soldiers have halted during a march and are seated on the high bank of a stream. The bank drops almost straight down, but levels off before it reaches the water, providing a natural stage. There a mock-up tank stands, on the stage of the natural amphitheater. About twenty feet from the tank a lieutenant is giving a lecture, and each word booms out and echoes through the woods, for he is talking into a microphone. The lines of the public address system are concealed, and to hear this drama unraveling here in this wild spot gives an eerie feeling. The lieutenant's audience is all eyes and ears. He's telling how to kill a tank almost with bare hands. Assisted by a sergeant seated near by, making up Molotov cocktails out of oil and gasoline, the lieutenant continues with a precise explanation of how one of these bottles filled with gasoline will explode on contact and blanket the tank in a sheet of flame.

"All right now! Keep your eye on that bottle!" the lieutenant booms into the microphone. The sergeant has prepared one of the "cocktails" before the eyes of his soldier audience. He lets go with a quick snap of his arm, and the bottle smashes against the tank. The mock-up tank, welded together from sheets of scrap iron, immediately bursts into flame.

The sergeant has several extra cocktails handy. He picks up another and lets fly. Another spurt of flame is added to the already



Combat training never stops, even in Iceland where this photo was taken. Left to right: Sgt. Cleveland Allen, Corporal George Shermas, and Private William Hill, attached to a liaison section, carry on two-way conversation with their base command post while troops went through combat exercises there.

furious blaze. The sergeant hurls more cocktails, until the tank is a seething mass of white-hot fire.

It is not pleasant to think what would happen to the occupants of such a monster if so attacked on the battlefield. But these soldiers must be taught all the tricks of bitterest warfare. With their instruction they are constantly reminded that this is a war in which the soldier either kills or gets killed. He has to fight, and fight with all his heart from the word go. It is likely that these young soldiers will eventually be Signal Corps radio operators, linemen, telephone switchboard repairmen and a dozen other types of experts in various phases of communications, but above all they must know how to fight. Every soldier now has to know these tricks. There is no longer a soldier in the Army who doesn't at one time or another find himself in the midst of battle fire, perhaps from air attack far behind the lines or at the front itself, regardless of his particular branch of the fighting service.

Although the Signal Corps soldier's job of keeping open the communications lines may at first look routine, it is admittedly one of the most dangerous in battle. It requires a combination of superb mechanical skill and the ability to defend or attack as an infantry soldier. And the Signal Corps soldiers learn their lessons well.

In another demonstration area the Signal Corps recruits march to the site of a series of foxholes and machine-gun pits. These holes are dug into the ground in various types of odd-shaped patterns. However, each particular type of foxhole or machine-gun position must be protected by a specific type of camouflage and must be dug in a fixed pattern or to a specified depth. One foxhole is dug into the ground in the shape of a V. The lieutenant standing by says this form is safe in an area subject to tank attack. Were the foxhole dug in the form of a long trench, the tread of the tank might easily drop into it, crushing the occupants of the hole. An-

other foxhole looks much like an excavation for a telephone pole. It is round and just deep enough to conceal three-fourths of a man's body if he stands, and is large enough in diameter to afford a reasonably comfortable sitting posture. Beside the foxholes are different types of improvised camouflage nets. Camouflage covers for the foxholes are made from burlap or netting and some are even woven from twigs and branches. The keynote of this entire demonstration for these green troops is to illustrate the importance of improvising when necessary for protection.

On a large board panel near the foxholes a series of "color plates" are mounted. These plates are used to illustrate the extreme care to be exercised in selecting certain objects to be used as camouflage materials. A lengthy lecture goes with the inspection of this exhibit for each platoon as it descends on the site from out of the woods where they've been acting as security patrols or simply marching through the woods and over the fields.

Not far from the camouflage display is an open space of about two or three acres. It looks as though it might once have been a garden spot, but now it's ringed by barbed-wire entanglements and tall trees. A small stream trickles around one side. Close by is a deserted farmhouse. Back in the foliage around the rim of this open area two or three tanks are concealed. Machine-gun nests also are hidden there. This natural war stage is a perfect setting for the job the Signal Corps recruits are learning.

A patrol comes creeping through the woods. Men in the patrol sneak silently up to the leeward side of the old farmhouse. They move cautiously around the corners and slip quietly across the small stream, wading in the water which splashes up to the waist. The men move swiftly, bending forward and low, rushing up the opposite side of the bank to approach the open area across which they will have to move. They flatten to the ground now and roll and twist their way forward under the barbed wire. Often they will be



This armored force reconnaissance car is radio-equipped from radiator to nozzle of rearward machine gun. Here the crew halts for instructions, part of a problem during maneuvers.

shown how to open the wire entanglements with bangalore torpedoes.

Once they are through the wire, a machine gun breaks into a rattle on the opposite side of the clearing. Above the bark of the machine gun, explosions like those of the landmine burst all around the men. They are previously set charges now set off by a man concealed beyond the vision of troops hustling across the open field. The men charge for the machine gun, and out of the foliage where they were hidden come the tanks, roaring like wild bulls. For this lesson foxholes have already been dug, and the men either run from the tanks, trying to outdistance them, or dive into foxholes.

For a few minutes it is hard going and pretty exciting. But once the tanks have dispersed the patrol and broken it up, the lieutenant collects his shattered recruit forces and comes up with a host of military do's and don'ts and suggestions about what they should have done in such and such a set of circumstances.

This is rough, practical training, and the week drops the curtain on maneuvers by Friday night or Saturday morning. Long columns of weary troops who've learned how to care for themselves in the field trudge back along the road toward Camp Charles Wood, where they will once more resume some semblance of normal barracks life. As the men march in a long winding column, they are wondering just how much fighting they will have to do like that of the week just past. Some will wonder how much worse real battle is. Aside from the strenuous short stretches of calisthenics and some organized drill at Camp Wood, the next eight or nine weeks of basic training will be more academic than rugged. The ensuing weeks will turn green soldiers just through infantry training into orderly, well-knit regiments of experts.

SPECIALISTS MADE, NOT BORN

A TALL, LANKY 24-YEAR-OLD Texan dressed in khaki eyes the proceedings woefully. Up at the top of the high telephone pole, clinging like a woodpecker, is a trainee Signal Corps lineman trying with all his might to mount a wire on a cross-arm. For nearly five years the Texan has been stringing wires across the plains of West Texas and now—yes—now, with this crew of rookies, he's learning to do it all over again for the Army. Learning anew the technique which he took for granted before he joined up to win the Signal Corps' end of the war. True, he has the edge on the man at the top of the pole, for his five years' experience put him in good standing in the eyes of the lieutenant who is teaching these new soldiers the Army's way of doing what to the Texan is a routine job. The recruit at the top of the pole loses his grip with the steel spur on his heel. His foot darts downward and he slaps the pole with both hands, hugging for dear life.

There is an art to snaking one's way up a slender piece of timber and then performing a rough repair job when one reaches the peak. The man on top was a husky "soda jerker" in Vermont before war came, and he is finding that this kind of life is far different from mixing chocolate sodas, serving cokes and scooting fancy ice-cream dishes down a shiny white counter to the village belles.

But this is the Army's system. No matter how much and what kind of experience a man had outside in civilian life, the soldier still has to learn that the war job and the civilian job are considerably



When Signal Corps men take to the field for combat exercises, tents take the place of barracks. Here a lineman splices a wire to complete the bivouac area's communications system.

different in approach and execution. Stringing a wire across the prairie on a sunshiny day to the tune of a gentle west wind and a prairie dog's yelp is something different from stringing a wire across a shell-torn battlefield to the accompaniment of zinging sudden death in the form of flying lead and shrapnel and dive-bombing Jerries or Japs. Aside from pure, unadulterated skill, a knowledge of the first laws of self-preservation, such as first aid, hygiene and the use of firearms, the lineman now must know many things which didn't go with his peacetime communications job.

For instance, before the Signal Corps soldier puts his spurs into a telephone pole he first has to work his way through such subjects as the Articles of War mentioned earlier. These Articles serve a very definite purpose, as do all other academic subjects the recruit must dig into during the first four weeks of basic training. They are the laws of the Army. Before the soldier has a chance to tinker with a radio set or decipher a simple code, he listens to lectures on military discipline, customs and courtesies, military sanitation, hygiene and military organization. These academic courses all have a purpose too. There are also rules. By these it is possible for thousands of men to live together in an admirable degree of harmony, under shellfire or in the comparatively peaceful realm of barracks life.

Before the rookie Signal Corps soldier plunges into radio or wire communications specialties he must also have mastered the fundamentals of marksmanship and defense against mechanized, air and gas attack.

The basic schedule up to the end of the first four weeks has included marches, bivouacs, field fortifications practice, night operations, guard duty and rigid physical training. These are the courses and practices designed to make the recruit a well-rounded infantry soldier and give him the physical stamina and the knowledge by which to retain his stamina under any conceivable set of circumstances. In addition to these basic stages in the making of a Signal



Learning the ABC's of electricity. One of the Signal Corps Trainee's first lessons after Basic Training is in connection of ordinary dry cell batteries. From lessons such as this one, the student learns the fundamentals of communications circuits.

Corps soldier, the recruit, whether he is subsequently slated for a special job in radio or wire, gets certain fundamental training in the communications job's first phases. As an example, he must master the use of simple tools and learn thoroughly the methods of making simple electrical connections. These would include the use of the electrician's knife, pliers and screw drivers; connecting and testing ordinary dry-cell batteries; splicing wire, connecting and testing two telephones; and laying of wire circuits between two electrical objects.

In nearly every new batch of Signal Corps recruits there are many who have been telephone or radio men in civilian life. Every allowance is made for their previous experience, but on the other hand the Army is meticulous in its own training. Even the men with several years' experience get additional instruction. Taking wire splicing as an illustration, the technique of an experienced man can nearly always be improved and his speed greatly increased. The Army has its own system and methods of measuring the length of wire to be stripped for a splice, of removing insulation, or of forming good wire contacts for freely flowing signals.

These preliminary instructions in the simplest fundamentals of wire and radio communications come about the fifth week after induction.

During his General Classification Test some of the soldier's natural Signal Corps abilities were reflected. But it takes so much painstaking work and precious time to make a good Signal Corps expert that the Army sees to it that other tests in order are given early and frequently to determine to a very fine point the man's last degree of potential ability. If the Army is going to make a communications man it wants to be certain the man is the proper quality of raw material to begin with. So with Code Aptitude Tests, the Radio Telegraph Operator's Test and the General Electrical Information Test, it gradually weeds out men with little ability and no natural aptitude for at least one important niche. The men

dropped from Signal Corps training are quickly shipped to other arms and services where they can be of greatest service, although tests at the Induction Center are thorough enough to avoid the necessity of many transfers from the Signal Corps.

At Fort Monmouth's Camp Charles Wood, the replacement center is ready for the recruit to get down to business as soon as he sets foot on the post. Immediately regiments, platoons and squads are organized. A specially trained organization of noncommissioned officers, special instructors hired by the Civil Service and regular commissioned officers take over. At Camp Wood aptitude tests tell what the soldier is going to begin training for, and he is off to a running start. If he was a brokerage clerk in Wall Street he probably is soon in the midst of finding out what a message center clerk does, for that is likely what he'll be. A watch repairman or a skilled machinist may find he's to become a teletypewriter repairman. A male stenographer becomes a teletypewriter operator. Another young man who has a high school education, a nimble brain, is good at figures and alert to the nth degree, and in addition has a good speaking voice becomes a switchboard operator. A husky truck driver is told that from now on he'll be the driver of a special radio reconnaissance car.

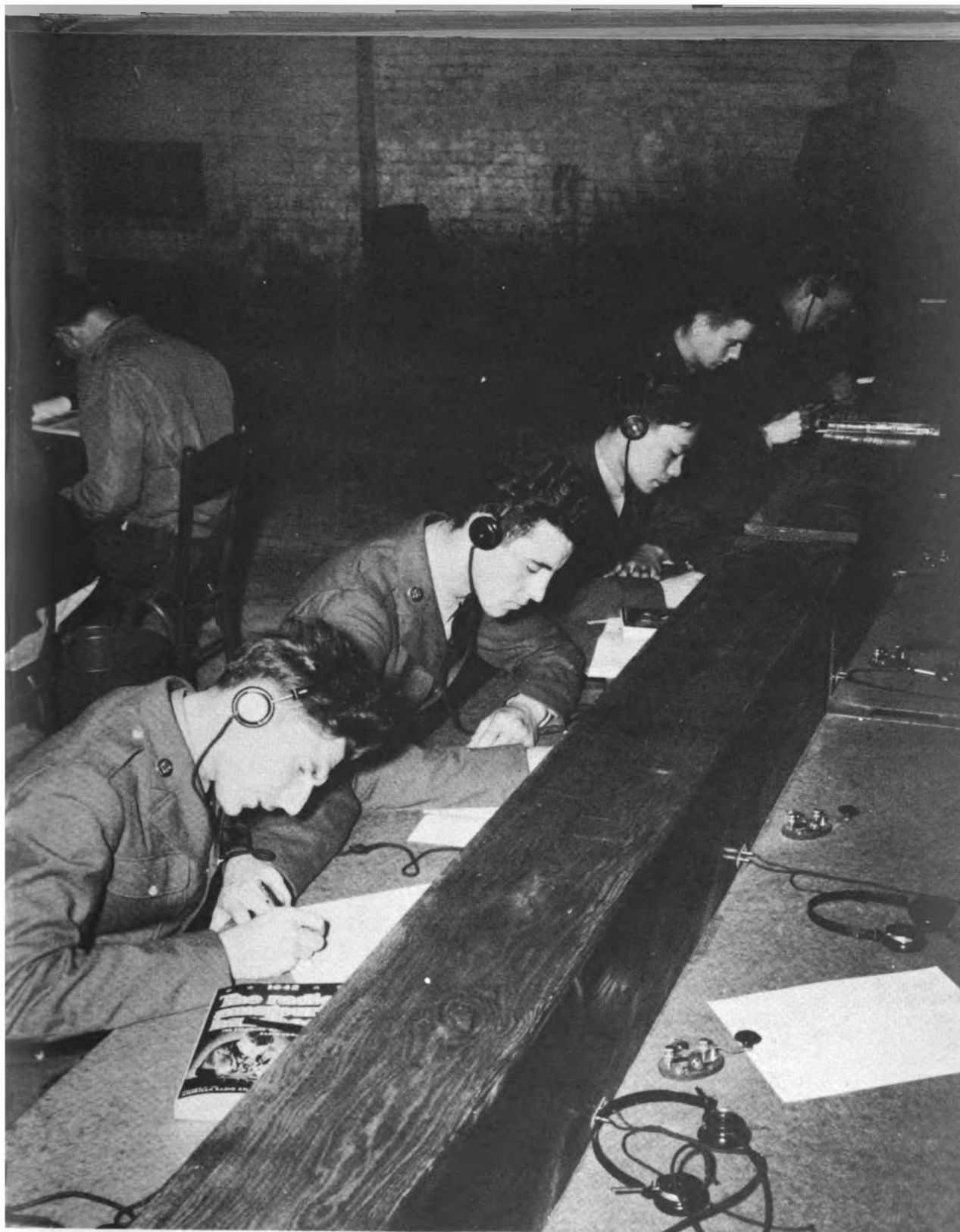
And thus the various skills, trades and occupations are outlined, the men scheduled for classes, the hours fixed, and they all settle down to the grind. It will take something like nine weeks to get these men in shape to go out into the field and join a regular combat outfit, but when they go they will be trained, make no mistake about that. They will know their jobs, and implanted in each of their minds is the conviction: "My job is important. It helps get the message through." A man driving a truck has little to do directly with getting a message through, but his truck may be the conveyance by which a telephone switchboard is moved to the scene of combat at the front. The message center clerk may not deal

with messages themselves, but he'll handle the important administrative routine necessary to make any organization a workable piece of machinery. By the same token, the telephone lineman won't work with messages, but there will be thousands of miles of wire to be strung and most of it probably will require poles. So it goes with the many specialized clerical, administrative and labor jobs. They have to be done, and the men who do them must know how to work fast, accurately and with the fighting spirit.

One feature of training at the RTC is the carefully planned course for field radio operators. Code practice itself is limited to about forty-five minutes or an hour at one sitting. Two or more periods may be conducted daily, separated by instruction in other duties of radio operating, such as forms and traffic procedures the man in the field will have to know.

Once a student has attained a receiving speed of five words a minute, instruction in sending simultaneously with receiving is begun. At this point his training is closely observed to see that the student does not develop harmful habits in transmission.

As soon as the student can send and receive signals, message forms, traffic, log and number sheets are introduced, gradually combining instruction in code and radio procedure. As a recruit progresses in deciphering dots and dashes and their meaning, he takes periodical trips out to the field, as well as to special classrooms to learn about and become familiar with the various types of radio equipment which will carry the dots and dashes he pounds out with his key. Together with his dot-and-dash learning, the student is coached in such subjects as methods of installing, methods of transporting, methods of destruction in the event of possible capture, characteristics and technical design, with such other fundamental electrical studies as may be required. When he first begins his training in the intricate business of radio communications, a radio sending or receiving apparatus seems to him something he can never



Taking code from automatic code machine which "plays" code from transcription, these students all get same message. Transcription can be speeded up as men progress with training in receiving message.

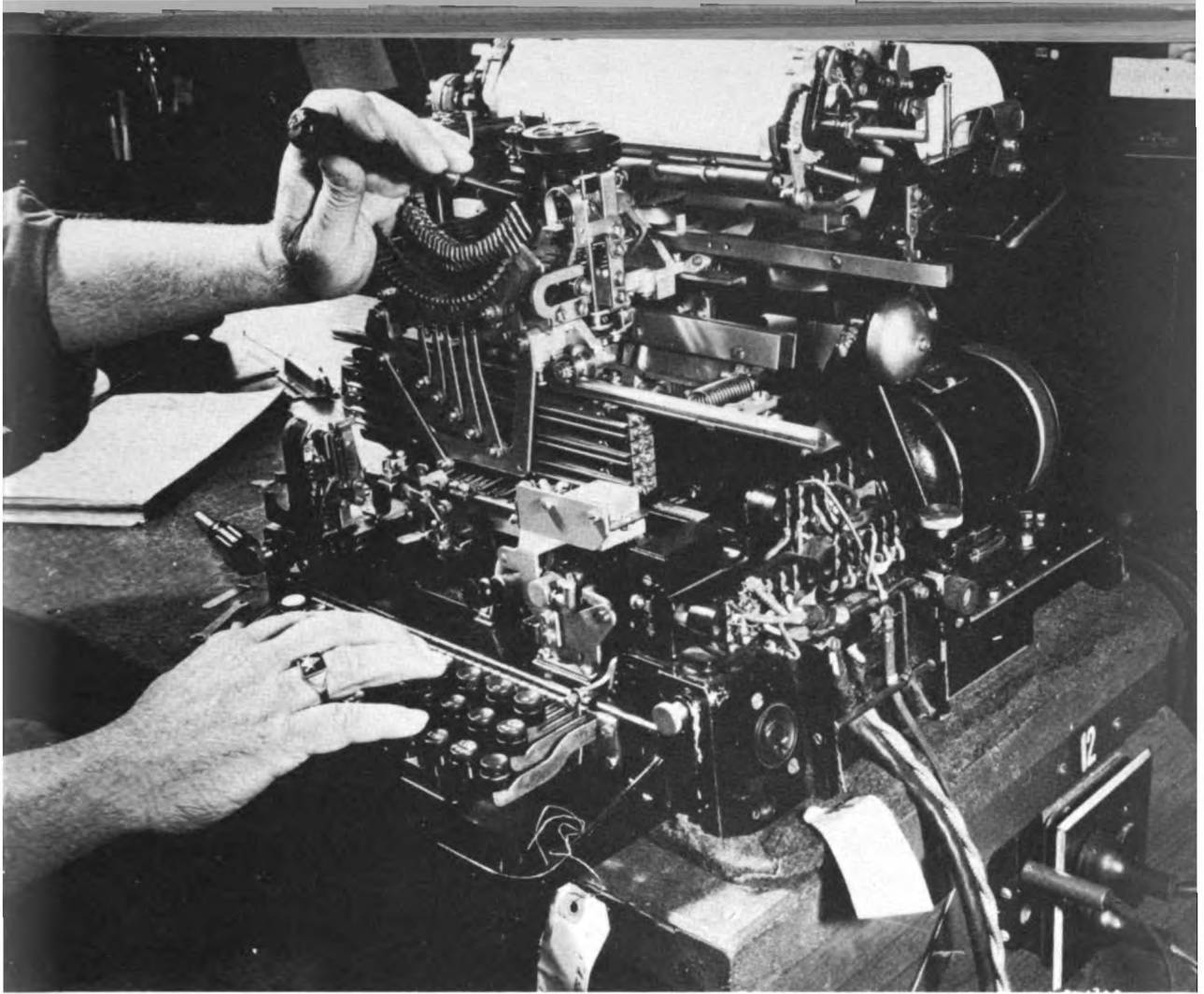
understand. But by slow stages at first and then rapidly as he progresses, these instruments cease to be difficult or mysterious. After a few weeks he can virtually take a radio set apart and reassemble it blindfolded, providing he's a student in a class for radio repairmen. Since each radio operator in a Signal Corps unit must be capable of operating any set in his outfit, the instruction at RTC covers thoroughly all types of sets issued to a particular type of unit. There are enough sets provided for students so that a key and log operator work together. They interchange duties frequently in order that each may become acquainted with the other's job.

The minimum skill required of a radio operator is that he be able to transmit and receive International Morse code at the rate of fifteen five-letter code groups each minute for three minutes; transcribe received signals in printed characters with a maximum of six erroneous letters; set up field radio sets and make necessary connections for their operation; adjust and care for field radio sets; test and care for storage batteries.

These tests and requirements do not vary greatly for any of the dozens of highly skilled soldier jobs in the Signal Corps. They all have to be good to pass, and they don't pass unless they are good enough to meet the standard.

When the historian gets around to the Signal Corps, he will find a sure bet for a striking page in Captain Reuben Abramowitz of the Eastern Signal Corps School at Monmouth, where these thousands of radio operators are trained so efficiently. Abramowitz used to be a private. Later he became a sergeant. And then when war came and the cry for radio operators went up in a hurry, the job which had occupied Abramowitz during peacetime became an important link in the long training chain. Back in 1930 neither soldiers nor civilians foresaw the tremendous need for radio operators that modern airplane and tank war, high-speed war, was to demand.

The big stumblingblock for radio operators was the typewriter.



Thousands of teletype machines are operating day and night in Army communications system around the world. They train thousands of repairmen and technicians at Fort Monmouth, N. J., Camp Crowder, Mo., and Camp Kohler, California, to keep these machines ticking off their messages.

In order to take messages at more than twenty words per minute, a typewriter was indispensable. Under the system existing in 1930, it required approximately 100 hours of instruction to teach a man to touch-type, and only after he had finished the typing course was he trained to coordinate and code typing.

Abramowitz believed that he could combine the two courses in one. He would use 100 hours to teach both subjects at once. The theory was tried out, and it has proved itself to the satisfaction of the Army—which isn't always easy to please. Especially are the top ranking administrative officers of the Army going to look more than twice at a revolutionary method of training when a sergeant comes up with it. In this case the Army made a grand slam. It had an ace in Sergeant Abramowitz.

By the old method of instructing radio operators a man learned, for instance, that the tone sound "dah-dit-dah" was the letter "K." Accordingly he would write the letter "K." In the Monmouth system the sound "dah-dit-dah" means to the newcomer not only the letter "K" but also the middle finger of the right hand struck in the "home key" position on the typewriter.

In the present system of teaching in the code and traffic section of the enlisted men's department at Monmouth, code is fed through headphones in what is known as "Z" groups. For instance, the "Z₁" group consists of the letters F, G, H, J, M, R, U. To those familiar with touch-typing it is evident that this particular group trains the index fingers of both hands. The "Z₂" group carries it further and uses the index and middle fingers of both hands—B, D, K, N, T, V, Y. These exercises progress until all fingers come into use in the remaining three "Z" groups.

In alternate periods during the school day the student copies code by printing the letters with a pencil so that he may become proficient either on the typewriter or by hand while he is receiving this elementary instruction; and spends a good part of his time in practice

sending, since, contrary to popular belief, it is more difficult to train a man to develop a good "fist" on the hand key than it is to teach him to receive the signals.

When a student's sending speed has reached ten words per minute he is trained in the use of the automatic high-speed key, or "bug." As the instruction progresses he is taught to read code by blinker light, and from stylus characters on high-speed tape; and is also taught perforator operation, teletype, page printer, procedure in handling traffic and actual circuit filing and operation.

When the Signal Corps soldier has completed the seventeen weeks of this special course after leaving the Replacement Training Center he is capable of taking his seat at the operating desk of a high-powered "fixed" station or manning a small field unit. Fixed station is the term applied to an Army radio station which is more or less a permanent installation and which handles channeled communications over a fixed network reaching through the higher echelons of the Army, such as Corps area headquarters or overseas stations in our foreign possessions.

The cycle of recruits passing through the Replacement Training Center at Camp Charles Wood, and those at Camp Kohler in California and Camp Crowder in Missouri, repeats itself every thirteen weeks. The courses are much the same, being changed as little flaws appear and brought up to date to fit the needs of the Army. Once through the replacement center, students are ready for assignment to Signal Corps units throughout the United States and to overseas task forces. Many selected students are retained at Monmouth and the other centers if they show special aptitudes for learning the more technical and complicated jobs. These men go to the Enlisted Men's School at Monmouth.

The training here includes fixed radio station operation, radio repair, cable splicing, installing and repairing telephone and telegraph systems, switchboard installation, teletypewriter maintenance,



Radio repair and maintenance experts trained at Signal Corps schools learn to detect flaws in radio tubes at a glance. They must be trained to make repairs under any and all battle conditions. Often a radio repairman may work in a blacked-out foxhole with nothing but flashlight. His brain and fingers must be nimble.

teletypewriter operation, and cryptanalysis. In addition, the Eastern Signal Corps School at Monmouth boasts model educational institutions for the military in the Aircraft Warning Department, Officers' Department and Officer Candidate School, and the Department of Training Literature.

Students who reach the Enlisted Men's School at Monmouth find two general types of instruction—wire and radio. They are selected for this special school at the Replacement Training Center on the basis of results of individual ratings in the Army General Classification Test and General Electrical Information Test, as well as by personal interview concerning civilian experience and proficiency in certain special lines of work or specific occupations.

Hundreds of men are also sent to the Enlisted Men's School from tactical units in the field, such as the Armored Force and the Air Force, to become specialists in communications for their respective organizations. On graduation from the courses here at Monmouth or at Crowder or Kohler, they are given special certificates showing completion of certain courses. These certificates serve as stepping stones for soldiers of promise on their return to their original units.

OFFICER CANDIDATE SCHOOL

IT IS NOT AS EASY TO GET the shiny gold bars of a second lieutenant in the Signal Corps as it may look from a safe distance. For the Officer Candidate School is where the student soldier answers all of the sixty-four-dollar questions. And that means he must know the answers at the crack of a question—not after he goes back to page fourteen to hunt up the answer. The officer candidate course is really one the boys write home about. It is a combination academic adventure and educational hurdle compressed into three months that seem the shortest on the calendar.

At this school where young officers are molded for the Army, one is impressed by the words of advice credited to the two-fisted Army Ground Force Commander, Lieutenant General Leslie J. McNair, who received a couple of shell wounds at an observation post up front in Africa. Obviously, he practices some of what he preaches. And here at Monmouth they take General McNair to heart, especially the officer candidates. The words are on a large placard just outside the door of the Intelligence Officer at Monmouth in Russel Hall, the administration building, with the letters in a size readable at twenty paces. "I have seen too often in this emergency the two infallible signs of utter lack of leadership: Reading from the book, and turning things over to the sergeant while the officer tries to look important."

That is the kind of challenge these Signal Corps officer candidates

have flung at them from the first day at this unique training center. The Officer Candidate School right off looms as no snap.

The Officer Candidate School at Monmouth is the largest department of the Eastern Signal Corps Training Center. Its capacity has been doubled and redoubled so many times the administrative officers have lost count. Thousands of officers get their training there and a new class is off the line every two weeks with fresh new commissions. They are then second lieutenants in the Army of the United States. Warrant officers and enlisted men for the Officer Candidate School are chosen by the commanders of the field forces, commanders of service commands, department and replacement training center commanders. They are selected on the basis that they have demonstrated outstanding leadership and possess technical and educational qualifications and personal characteristics required of officers.

The course of three months is designed to teach the candidates efficient administration, training and operation of tactical units. It is divided into three phases—the first basic, the second intermediate and the third advanced. Each is scheduled to cover about one month.

Once a student appears before the examining board composed of several officers at his tactical unit, or at the replacement center, and impresses them with his qualifications, he is well on the road to the Officer Candidate School. But having arrived at the school, he has no assurance that he will get a commission. For the next three months he will be checked and double checked, both by his officer instructors, called tactical officers, and by his fellow students.

A typical day at the officers' school begins at 5:45 A.M. with reveille. The tactical officer is usually a lieutenant, and he sees to it that roll call is prompt and orderly and that the men respond immediately thereafter with a healthy fifteen minutes of rugged calisthenics. After the calisthenics the men form in platoons and

march to breakfast promptly at 6:30. Breakfast consumes about twenty minutes, after which the men march back to the barracks. Then comes the job of arranging lockers in shipshape fashion, and rapidly. Shoes are shined, there is a rush to shave and a flurry of dashing about while bunks are made, floors cleaned and things tidied up generally, both person and quarters.

The men have been divided into squads, platoons, regiments and battalions. Commanders are named for squads, platoons and regiments from the ranks of the men by popular vote among themselves. It is up to the squad and platoon commanders to see that each man leaves his extra pair of shoes in the right place, that his locker is clean and orderly and that all the men are careful in all of their personal habits as they go about the business of living the life of student officers.

At 7:15 the men fall out by groups of between 35 and 40 men, each of which is numbered. They march to class and are in their seats at 7:30. The section leader stands, salutes the instructor and says, "All present, sir!" Then the instructor proceeds with the class. During the first month it will probably be mostly lecture. The subjects will include basic mathematics, dismounted drill, inspections, interior guard duty, map reading and mess management. In addition, the students learn more about military courtesy and discipline, sanitation, Army organization, radio code practice, and safeguarding military information. Other courses this first month will include signal supply, weapons, and identification of aircraft and vehicles. The sum total of hours spent at class during this first month will be 212.

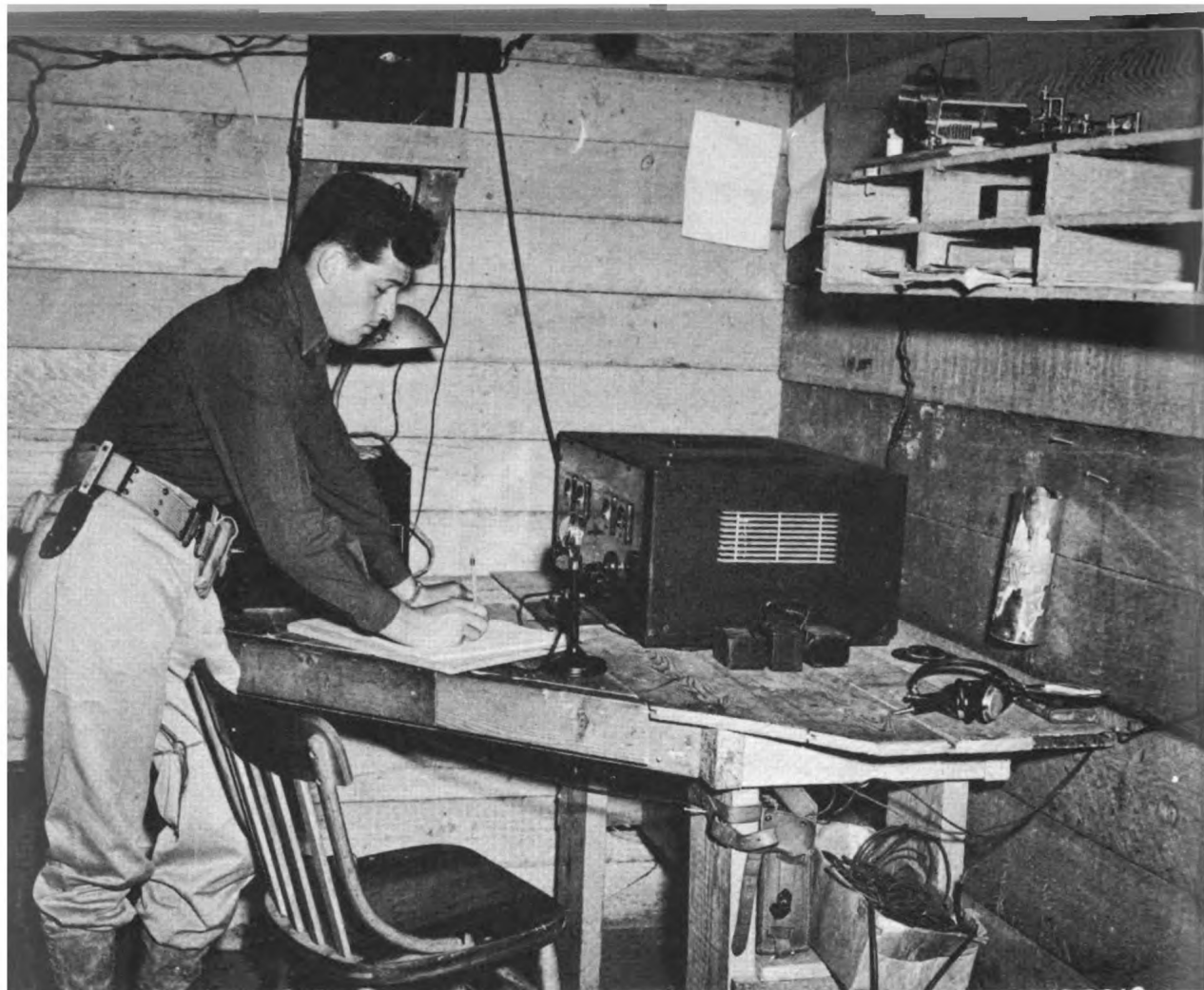
Each class is of forty-five minutes' duration, with a ten-minute breathing spell between classes. Four lectures make up the morning period, and then the men file out and march to chow. They have an hour and fifteen minutes for the noon period. Promptly at 1:15 back they march to class. During the afternoon session there is one

free period of forty-five minutes. With this interval to spend as they wish, the students scurry to the post exchange for a cool drink, write a hurried letter home, visit the tailor, or simply take a leisurely stroll to the club and listen to the radio.

The instructors are apt to introduce some novelty into the afternoon classes, for energy and interest both tend to lag after a heavy meal at noon. An instructor may call on one of his students to give a lecture on map reading, or ask another student to give a verbal discourse on company mess and explain just how he would react under a given set of perplexing circumstances. At 5:45 the classes are dismissed and the men march once more to chow.

After the meal they are free until 7:15, when they fall out and line up again by sections and off they march to the study hall. This study hall session from 7:30 to 9:30 is required five nights a week. It is supervised study, and there is no loafing or horseplay. At 9:30 the men are free again after marching back to the barracks. During the half-hour before lights are out at 10:00 a few will polish up shoes, clean and straighten their lockers and in general prepare for the following day.

The men at the Officer Candidate School lose their identity with any former rank and become just plain Mister to each other. Some have been master sergeants, some corporals, and others were just ordinary privates. But now with the rank of Mister attached to all, the level is set. From there on it is up to each man to do his best with each little task, no matter how trivial. He may have to shed some personal habit of carelessness, such as tossing matches on the floor, or constantly asking special favors of whoever happens to be within earshot. He has to become a self-sustaining individual—he has to row his own canoe. If he's grouchy and sulky in carrying out the orders of his student commander he may soon find himself en route back to being a sergeant or corporal again. Every man must keep on his toes, try to cooperate and hew to the line.



This young man was the prize candidate of the Officers Candidate School at Fort Monmouth, N. J. He is Joseph L. Lockhard who, as a private of Signal Corps, manned the aircraft detector which picked up the approach of the Japanese air force 132 miles before it reached Pearl Harbor, December 7. July 12, 1942 Officer Candidate Lockhard was graduated from OCS as 2nd Lieutenant.

The system by which the men are graded is by the number of demerits or "delinquencies" a man gets on his score card. When the men enter the OCS each is given a sheet of paper with the names of all the men in his section. Periodically, he is expected to report on the conduct, attitude and the general behavior of as many men as he can conveniently keep a check on. This system serves another purpose. Besides helping the officers to grade the men for their officer ability, it tests each individual student's ability to judge others. This is important to becoming an officer; and this ability will be in ever-constant use once the man becomes an officer responsible for his men each hour of the day and night.

For convenience in handling the class routines, the men are further divided into sections the first week. During the basic training period the section is usually about 70 men. During the second month, or intermediate period, the number increases in each section to 170 men; and in the final month or advanced phase the number increases to 270 men.

The routine of each of the three months contains one or two outdoor exercises to see how the men get along in the field. For instance, one night after chow the student officers are divided into three groups in each of the sections. Each group is given a set of instructions, handed a map of an area in some wild, uncultivated part of the post, and also a compass.

The men are all hauled by truck out to the untamed area and dumped in the woods. Each group is taken to a point a considerable distance from the others. On the map is a spot which may be called X. The students will be expected at a certain hour and minute, if possible, to come out of the woods at the spot marked X. They will all be expected to reach the chosen spot at or about the same time. And as they go through this maneuver they will be expected to observe all the rules of security, that is, they must keep all lights out except the flashlight, which must be used guardedly. It is no

easy trick to be dumped in the woods in the dark of night and try to follow the compass to a strange point on the map. But since this is the way war works in Tunisia, the Solomons, and perhaps a number of other remote regions of the globe, these officers discover map reading is important, and they learn about it the practical way as well as the academic way.

On another day the men are loaded into trucks or buses and taken to the rifle range. All day they fire at targets and practice dismantling weapons and reassembling them until they know the ABC's of firearms. Since most of the men have been through basic training and since most of them are above the average, they learn fast. Still another day may find the student officers practicing machine-gun firing and learning the appropriate methods for establishing machine-gun positions.

About the beginning of the second month, or intermediate phase of the training, they will go out in the field and will set up practice radio nets. They will send and receive messages, after assembling and wiring up the equipment. In addition, they will set up telephone switchboards at separated points, wire them properly and string wires between them. They will study the methods of loading and unloading such equipment, and how to handle it under all types of conditions and on almost any character of terrain.

The courses of instruction they get in the classroom during the second phase will include administration, defense against chemical attack, elements of electricity, inspections, marksmanship and combat exercises, dismounted drill and motor transportation. Army organization in a more advanced phase is introduced along with radio procedure, tactics and technique of signal communications, plus the previously mentioned range instruction. The same rigid daily class schedule prevails, with the five nights a week in the study hall with an officer keeping an eye peeled for any slack. There are

few if any gaps in the day, and it's a virtual dawn-to-10:00 P.M. grind. In the second month the instruction in all of the various courses will total 242 hours of lecture and field demonstration.

Although the rigid routine of the class-to-class hustle eases off on Saturday morning, there is more alertness required. Saturday morning there is the orientation lecture. The news of the world as it deals with war—and there is little that doesn't—is delivered in capsule lecture form. The men are told about what is happening, for few get time to browse through newspapers and digest the facts. Orientation does this for them, and thus the officer is always kept aware of the size of the job ahead.

The weekly review is at 4:45 P.M. each Tuesday afternoon. The men fall out, form in regiments and away they march to the drill field with company guidons flying and the post band dashing off a lively march. The school officials, administrative officers, perhaps a few visitors and any War Department officials in the vicinity come out to watch the parade. The officers march like West Pointers, and their every step is scrutinized with eagle eyes.

From 4:45 P.M. on Saturday until 5:45 A.M. Sunday the student officer is a free agent on the post; a few get passes to leave the post. The men are so crowded to keep up with the stiff courses and the amount of instruction that many keep their noses in books, studying rules and regulations and cramming toward that final day when they will become officers of the United States Army.

When the third month rolls around for the final phase of training most of the students are pretty sharp. They are no longer required to take time out for dismounted drill. Instead, this period normally is spent learning unarmed defense. This is a polite name for knock-down-and-drag-out or hand-to-hand fighting as it would be done if you were caught at an advanced position without weapons. This is rugged stuff, and even includes instruction on how to whittle the



This photo pictures a typical field army signal office. The officer shown here is Brig. General S. B. Akin, Chief Signal Officer of General MacArthur's staff in Australia. When this photo was made, he was Colonel Akin on maneuvers with troops in Louisiana.

enemy down with a good sharp knife or give him the familiar "rabbit punch" effectively. In other words, how to kill a man with bare hands.

One of the nice little privileges of the third month at this military school for Signal Corps officers-to-be is the Sunday pass. It is not difficult to get off the post on Sunday, for a pass is had for the asking by a man in the third month. In earlier stages of training one might have to do some tall and fancy explaining to get one.

Another encouraging bit of news to the students who have survived to the third month is that they may begin planning for and even giving their orders to the post tailor for the uniform of a second lieutenant. Students of this phase are allowed, two weeks prior to graduation, the credit with which to purchase the uniform. Three days before graduation all students must have these fresh new uniforms ready for a thorough inspection, although they are not yet permitted to be seen in one.

Somewhere, at one stage or another in the course, about 25 per cent of the student officers are washed out. Not all of them, however, go back to their original units to take up noncommissioned status. Many or most of them get a chance to take a few extra weeks of training in the subject which has proved to be the stumblingblock. A young soldier may have all the other prerequisites for becoming an officer, and fall down in administration. By the extra weeks of studying and demonstrating that he can eventually acquire the necessary knowledge, he will eventually get his bars.

During the third month student officers will get 203 hours of instruction. It will include classification procedure and Army postal service, and basic signal communication in both radio and wire. In addition, he will study a course called "board of officers," as well as courses in customs of the service, inspections, local security drill and dismounted drill, plus military law.

Other courses will be rules of land warfare, tactics and technique

of signal communication, training management and field exercises, during the last of which he will demonstrate some of what he has learned.

A new technique has recently been added to further the training of junior officers at Monmouth. After the students become officers they are apprenticed out to more experienced officers on the post. The older officers take the junior officers under their wing and give them personal and practical instruction in such assignments as training management, first aid, field sanitation, and various administrative jobs.

On the day before graduation the officer candidates, perhaps five or six hundred in number—some classes have been as high as a thousand—are told the mechanics of the ceremony to take place the following day. They're told how to march in the procession up on the stage to receive the commission, how to shake the General's hand and what to say and so forth.

On graduation day the men fall out and line up by battalions. They march to the post theater early, where the exercises are to be held. At the last minute there may be two or three student officers checked off the list by the regimental commander when news arrives that Mister Bill Jones from Sioux City or Mister John Smith from St. Paul has failed. Few, however, are dropped out at the last minute.

Normally the theater is crowded with friends, relatives, wives and sweethearts there to see the men become officers. With the entry of the Director of the Officer Candidate School and the Post Commandant onto the stage the ceremony begins with the national anthem.

When the graduation exercises are over, the General's speech has faded away, and the last man has filed across the stage to receive his commission, the signal is given and the men in unison break out in violent war whoops and shouts, whistles and screams.

For this is their first freedom since the drama began three months before. The tension cracks all at once. The audience usually joins in and the show is over.

The men make their way back to the barracks. They hurriedly pack their old uniforms, other clothing, books, papers and miscellaneous items an enlisted man must have in his possession as long as he is an enlisted man. They mark an address on these military items, mementoes of the enlisted man's days, and give them the fond farewell to be sent home for the duration.

Signal Corps officers may be sent to join tactical units or to task forces, or many of them may be retained at Monmouth to pursue further specialized training in advanced courses offered only for officers already commissioned.

MEN, WORDS AND WIRE

THE PULSE OF AN ARMY IS the staccato chatter of the radio code set, the clanking of the telephone bell, and the rat-a-tat-tat of the teletypewriter. These are the sending and receiving ends of the Army's vast nervous system. Without them the booming of cannon, the machine gun's bark and the roar of mighty tanks would be all together ineffective. For the communications system, which is comparable to the nervous system of the human body, makes the Army a working machine. The Army in the field can have every death-dealing device conceivable at its command, but without communications—the wire systems and the hundreds of radio sets—it would be completely disorganized in a matter of hours. Artillery would soon be directed at its own supporting infantry troops. The Air Force would very likely be bombing and straffing its own supply trains and headquarters installations. In fact, there would be no headquarters, for a headquarters does not exist until it is securely linked with every single component of its fighting force.

Thus the Signal Corps' web of communications is the Army's life line. Over Signal Corps wires, over equipment procured and maintained by it and over air-wave channels planned and directed by it, the Signal Corps virtually dictates the power and strength of each fighting unit. Every word, every order, command, and directive traveling over the air or over wires is handled directly by or through equipment procured, maintained and in most instances operated by



Signal Corps trainees are laying field wire from truck-mounted reel. When going gets rough, reel can be removed from truck, loaded on back of jeep, or if necessary can be carried by hand. From a reel mounted on vehicle wire can be laid as fast as 30 miles per hour, depending on terrain.

Trainee linemen learn to climb a pole and mount wire on insulators. Normally such installations would be far back of front lines in theatre of combat. But Signal Corps would still have the job.



Signal Corps men. This chapter deals with wire communication, and radio will have its place in another chapter.

Wire communication was first used during the Civil War, although it had been preceded shortly by the wig-wag system in which flags were used to transmit coded messages. Both systems continued through the Civil War, and were in use through the World War I. Even now signal flags are used in some emergencies. During the first World War the telephone was improved in many ways. One of these was the electronic tube, first cousin to the ordinary radio tube, which was wedded to the telephone in the World War and stepped up the telephone's efficiency one hundred per cent. The tube was used at repeater stations, made the voice clearer and provided longer telephone channels. The progress and development of the telephone since the first World War has been great, and now every new device developed with the telephone is being applied to war. The Signal Corps is working closely in its own laboratories with telephone engineers of the great systems, constantly improving the methods.

What has proved to be the most applicable of communications devices thus far, outside of the radio and telephone, is the teletypewriter, the same type of machine that clicks away in railway, Western Union, or business offices. The teletypewriter gives a direct private connection between two points and at the same time makes a carbon or several carbons of any message transmitted through the machine. It provides an accurate and readable transcript of any message fed into it. Teletypewriters connect all Corps areas in the United States. They tie together all our headquarters and larger installations in the theater of operations.

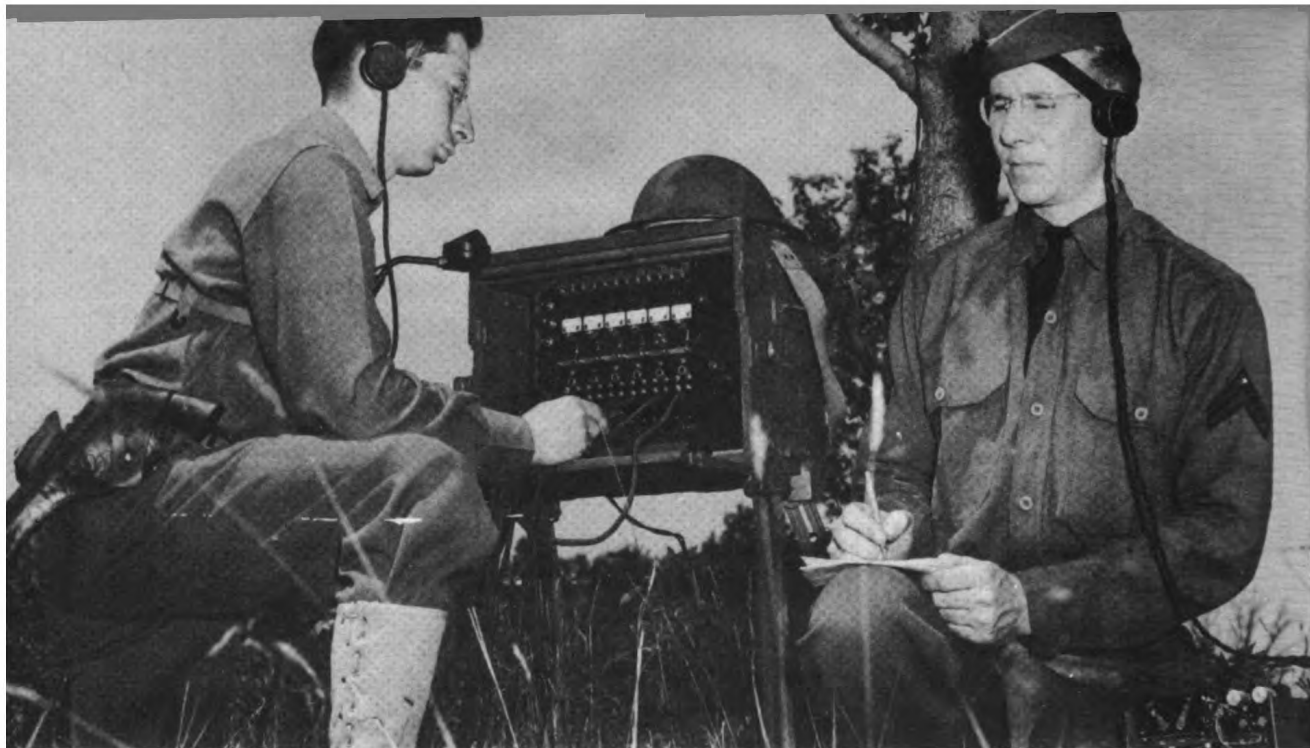
However, these machines are only one link in the communications system. They are instruments of the communications system along with the telephone, radio, motorcycle messenger, carrier pigeon, signal flags and signal lights, such as flares, rocket guns, electric

blinkers and cloth panels which are laid flat on the ground. Each at a certain time and in a particular set of circumstances, is as important as the other. For an Army in the field, suddenly forced to retreat, or to move ahead under bombardment, may find use for any one of the above systems. If radio silence is desired and no wires are laid back to a headquarters, the commander of a company may resort to blinker lights or rocket flares at night, carrier pigeons by day, or panel strips laid out on the ground to signal friendly aircraft. The Army overlooks no method. It relies on wire chiefly because it is the most reliable for a large traffic load. It is private, and messages cannot be easily intercepted. It is clear, and messages can be easily repeated. It is simple to operate and easily installed, whether across a range of rocky, heavily timbered hills or across a hundred-mile strip of desert.

A smart field commander never overlooks any communications bet and if possible he has all of them at his command, no matter how old they are or what is their physical condition or speed. He knows that sooner or later he may have one of his communications media, such as the teletypewriter, telephone or radio, disrupted by enemy wire-cutters, paratroopers or a well-placed bomb. There is no sure guarantee, regardless of how good it is, that a communications set will work perfectly in the face of some particular set of battle conditions. Thus, even when a Signal Corps crew runs a telephone wire over a hill and through a valley to a command post at a forward position, it normally will retrace its steps laying a second double circuit of wire back to the starting point.

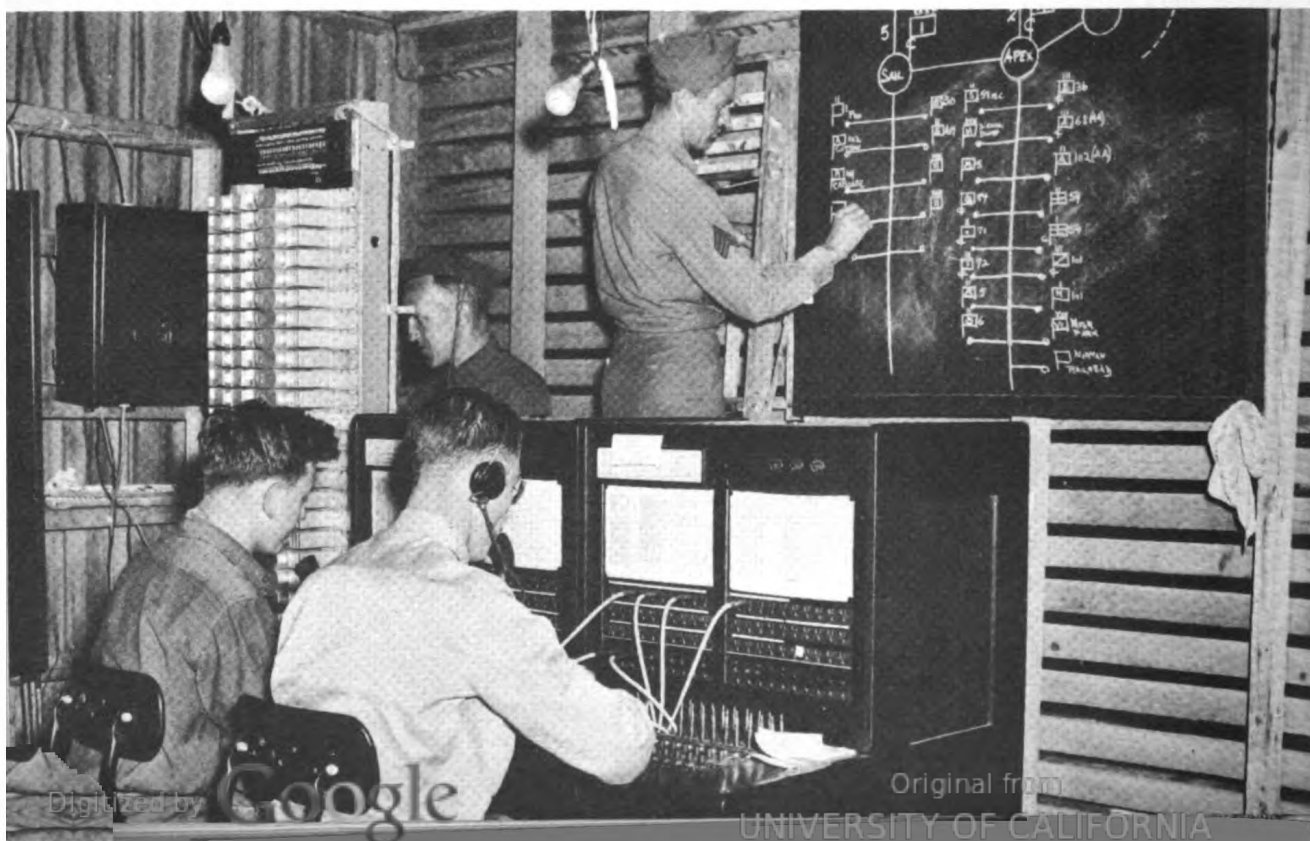
Wires can be cut by enemy troops who filter through the lines. They can be cut by the treads of heavy vehicles and tanks, and even by rolling boulders jarred loose on a hillside by the landing of a heavy artillery shell. So, although wires are able to carry a big load, they are not invincible and they are not foolproof.

One other major reason for the use of many wire communications



The Signal Corps soldier on the right operates a field telegraph set while the man on the left plugs in a connection on a six-line field switchboard. Signal Corps wiremen are trained to work in pairs or teams. Each man must be a specialist.

Here is a typical telephone switchboard of an Army Corps headquarters. This board can be disconnected from cable in a few minutes, loaded onto a truck, and rushed to any part of the combat area. It can also be operated from the rear of truck while vehicle is stationary.



systems is that radio sets concentrated in a specific area are difficult to operate without jamming each other. Before they are used extensively in an armored force, for instance, carefully fixed codes and channels and wave lengths must be prescribed. Such planning requires almost superhuman skill and expert timing, and above all intelligent operators and technicians. For example, an armored force going into battle does not plunge in with a hundred tanks and simply scatter out like jack rabbits darting here and there, without direction and control. Before they go into battle operating their radios on a fixed net called a "command net," frequencies must be set up in advance, and their radios kept tuned to or operate on those frequencies. Thus the entire operation must be synchronized and skillfully handled from the instant the tanks leave their rendezvous until they have negotiated the complete action and return to their base. Therefore if other radio communications were being maintained in the area other than those of the tanks themselves keeping in contact with their commander and each other, the outside radio activity might be responsible for disruption of the tank force's command net and thereby result in a disorganized action. So the wires carry the burden in all areas where congested radio channels do not permit a ready and instant flow of communications traffic.

Thus, in keeping with its traditional motto, "Get the message through," the Signal Corps attempts to back up each mode of communication with one or several means to guarantee the delivery of war words. At the front, for instance, at a typical headquarters of a division radio code sets will be buzz-buzzing their dots and dashes, telephone bells tinkling out commands for receivers to be lifted and teletypewriter machines keeping up a steady, humming rattle, and when possible these teletypewriters will be connected with the most forward of the division's echelons. Telegraph lines fan out to the air force units, infantry, artillery and armored force commands all the way down to the regiment headquarters.

When the Army is in the field the normal procedure is for the higher unit to project the communications lines to the lower units. Thus it becomes the Signal Corps' job to put in lines between all headquarters facilities down to the regimental headquarters. From there on through the various companies, more advanced types of units have their own communications men who set up radio contact and wire connections. However, the radio sets and telephone equipment are furnished by the Signal Corps and most of the men are trained in Signal Corps schools, with the exception of the Armored Force and the Air Force, which have schools of their own for their communications men. This is because of the peculiar mobility and nature of their operations. Communications men in the Armored Force and Air Force must be schooled in the technique and tactics of their particular operations and in the behavior of their equipment, such as tanks and planes. Thus, with the aid of the Signal Corps the men are trained to operate as individual members of these forces rather than as units of the Signal Corps assigned to them.

The vastness of the scale on which the Signal Corps operates is as great as the war itself, and this means that its lines extend around the globe. But the job of wire communications in one theater alone is almost breath-taking. As an example, when our forces fought their way through North Africa, driving the Axis into the Mediterranean, they not only had the communications work of keeping the fighting units knit together while they battled. As the army moved ahead permanent installations were set up. Thousands of miles of telephone and telegraph lines had to be constructed. The equipment left by the Axis had to be resurrected and put back into working condition. One of the first actions of a retreating army is to destroy as much of the communications facilities as possible. Therefore, as the Axis armies retreated they destroyed telephone and telegraph exchanges and tore down the wires. While our army moved ahead,

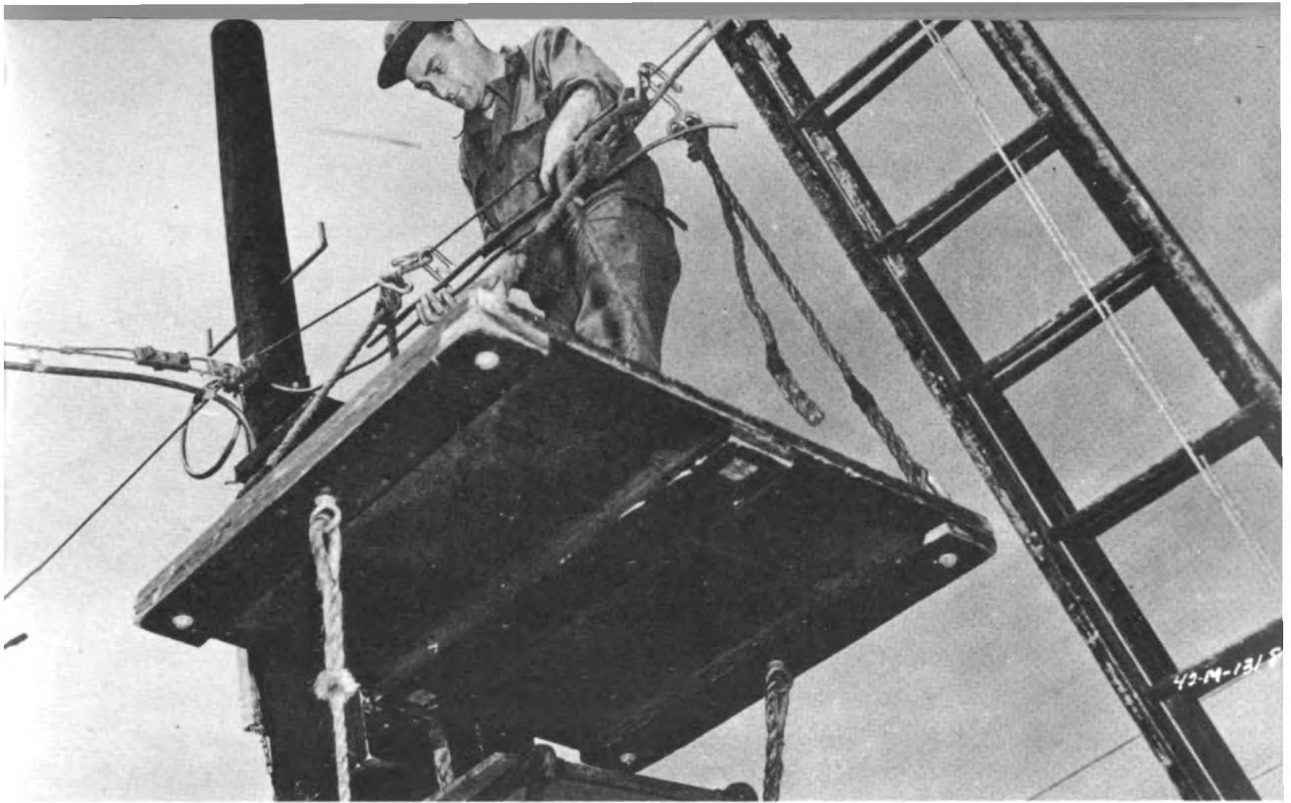


Here colored Signal Corps troops are learning how to string a telephone line 'cross country. Often the line may be hung on tree branches far from a roadway. Heavy vehicles following a roadway will frequently cut the lines; thus in combat area Signal Corps linemen take to the woods.

it proceeded through some heavily populated areas where thousands of people were struggling to carry on some semblance of living. When many people are gathered in one spot communications are vital to their daily life. They must have them to facilitate the movement of food, clothing and other necessities of life. Therefore the Signal Corps had the task of resurrecting the communications system, setting it in order and in many instances relying solely on its own personnel to operate them. For in such an area communications have to be religiously guarded lest military information damaging to our forces, find an outlet through telephone or telegraph employees, fifth columnists or others not sympathetic to the advance of the army.

The Signal Corps in Africa and the other theaters of war have already demonstrated the thoroughness and soundness of their training and equipment. With trucks, jeeps and even command cars, and in some instances on foot, they have strung thousands of miles of wire to keep our army operating. One story which demonstrates vividly the teamwork and efficiency of the Signal Corps and the Artillery has finally trickled back home. There will undoubtedly be hundreds of such examples, but this one is worth repeating in this story of the men who keep the wires open.

Our forces had driven to a point some distance north of Lake Achkel, which is west of Bizerte. There they were being halted and could not move forward under the terrific bombardment of German batteries. The stalled unit did not have heavy guns along, but another American artillery unit some distance away was in a position to blast the Germans out of their position. However, the unit which commanded the heavy artillery in a position to knock the Germans out had no point from which to plot the Germans' artillery. There were no communications facilities available to get the two separated American troop units directly connected so that they could carry out the job. However, both Yank units had communications strung



This Signal Corps student is getting first-hand experience in cable servicing and repair at the Training Center, Fort Monmouth.

These Signal Corps men are splicing a cable in the field. Much painstaking work and long hours of practice are required before a student masters this trick.



Original from

UNIVERSITY OF CALIFORNIA

from widely separated points in the rear. So the Yank outfit in a position to plot artillery fire sent a message back some one hundred miles over its wires to its headquarters and asked that the observations and other data be relayed in a roundabout way to the artillery unit in actual firing position. Thus the message went back, and was routed through headquarters and other command posts back up to the Yank artillery. Very soon the Yank guns barked and the Germans were presently blown off the African map.

The way the message traveled might be compared to a man in Brooklyn calling a man in Washington, D. C., telling him to relay a message through Chicago, giving a man in the Bronx in Manhattan a tip on a sure bet on a horse at Hialeah. But it was good American ingenuity working on African sand, through shot and shell.

RADIO AT WAR

IN ONE BROAD SWEEP, radio affects the lives of more individuals over the whole surface of the globe than does any other single instrument. In war it can be classed as an instrument just as effective as the Air Force and its thousands of pilots, mechanics and planes. That part of the radio war in which the Signal Corps is engaged is only one small facet of the entire world war picture. The Signal Corps radio beams themselves blanket the world and almost hourly wing their way over deserts, oceans and mountains with messages or commands which have earth-shaking effect in the battle zones. Radio has indeed gone to war.

In jeeps, command cars, trucks, planes, tanks, on mule back in the mountainous areas in which our troops fight, and in fixed radio stations of the Army Communications Service, radio is striking a mighty blow for the final victory. The Signal Corps is not immediately concerned with the propaganda war blazing through the air every minute of every hour of every day. The Signal Corps radios are the instruments operated in the vehicles that carry the men and munitions; at the controls of the giant coast artillery guns; at the field artillery control stations near the front, and on the backs of men who carry the tiny one-man trans-receivers far out in front of a forward command post. These are the instruments the Signal Corps men set up, operate and maintain. Radio ties together in an invisible net the Armored Force, the Air Force, and other operating ground

forces. It gives eyes and ears to the paratrooper, the infantryman, the engineer, anti-aircraft gunner. It links together such units as the anti-tank units, evacuation hospital, quartermaster battalions, ordnance ammunition companies, surgical hospitals, quartermaster railhead companies, salvage collecting companies, veterinary companies and bakery companies.

All of these many-sided organizations within an army have a vital function. They must operate smoothly their various commands and work in close coordination with each other. They must work fast and systematically, regardless of bombardment, mobility of the unit, or any other unforeseen circumstances which may arise.

This speed of movement, fine coordination and teamwork, from the lowest rank in the lowest company of the last echelon, is possible because the order can be flashed and executed by precise split-second timing through the aid of radio. Radio has given as much momentum to war as the tank or the plane or the other speedy mobile fighting units.

As fast as the Army moves over a particular terrain, the radio networks are established. They may extend only for a few miles and parallel ground lines of telephone crews, but they go ahead nevertheless. They can even proceed farther, in advance of the telephone, for a man with a handie-talkie set (it has superseded the walkie-talkie) can walk, crawl or worm his way into an advanced position which could not be reached by heavier equipment such as might be necessary to establish a wire point for a telephone.

The radio gives vertical and horizontal latitude to action on the battlefield not possible by wire communications. For instance, a wire must be laid almost directly between two points. But with the fluid motion of modern war two such points might be rendered out of bounds of an action in two hours' tank fighting and become useless to the particular headquarters from which it was strung. On the other



Signal Corps men are expected to carry on communications work even in the event of a gas attack. This trainee is hooded with the new Diaphragm gas mask and still talks into the microphone.

hand, the radio set in the jeep, command or reconnaissance car, or in the tank moves with the action.

However, the necessity for creating networks on carefully planned frequencies and the possibility of enemy jamming of these frequencies make necessary the supplementary wire communications as a safeguard wherever they can be laid. Thus radio is always backed up by wire wherever possible.

All radio operators must know Morse code, even though most of the sets in the field are equipped for voice transmission. Often the code can be detected and deciphered when the frequencies which carry the voice are inaudible. The recent development of frequency modulation radio has now reached the point where radio is almost letter perfect in both transmission and reception, and the possibility of jamming by the enemy is being lessened. The frequency modulation set has a voice transmitter which is sometimes known as the throat microphone. Two metal disks catch the sounds from the vocal chords and translate them into clear sound in the ear of the recipient of the signal. Also, this new type of radio knocks out interference and outside sounds which formerly made tank-radio operations undependable. Now the operator of a radio inside a tank, in spite of the terrific noise and heavy sounds of shelling or firing from his own tank, can hear signals plainly. In addition he is able, by use of the throat mike, to operate with both hands free to fire a gun or drive the tank itself.

The compact sets developed for use in reconnaissance cars and jeeps and other vehicles are light and easily operated. They are almost foolproof, and do not require the highest skill for their operation.

In the event a vehicle is disabled by shelling, the operator of the vehicle can simply detach his radio, carry it to a safe spot and continue operation. Thus he does not become inactive with the destruction of the vehicle he operates. He can still be a valuable observer,



Here is a mobile message center with a radio operator contacting commanders of units scattered over a wide area. Built into the rear of a truck, this message center can travel as fast as the armored, or ground, forces.

UNIVERSITY OF CALIFORNIA

relaying back his observations to the command post or to the company commander who may be riding in another vehicle some distance away.

Aside from the many different types of radios used in the Army's motorized vehicles, there has been a new development on the war fronts requiring a new field of radio action. This is called radio intelligence. It includes the many radio locators, detectors and radio instruments for jamming the air channels of the enemy. Most of these devices are highly secret, for obvious reasons, although the Secretary of War himself, in an address to a gathering in New York in 1942, announced the use by the Army of radio detectors which approach the realm of magic. These radio detectors, said the Secretary, could reach nearly a hundred miles out to sea and put the finger on the exact location of approaching vessels or aircraft.

Thus the Signal Corps' aircraft warning system is not only well equipped to guard our shores, but there are innumerable uses overseas to which these sound-detecting devices may be applied. It is no secret that we have radio devices which can detect radio activity in given areas. Therefore on the battlefield the use of radio is carefully guarded lest its operation in a certain area might give away the location of a communications headquarters. Often the presence of radio activity in a given area may be the prelude to an enemy attack. On the other hand, such a tricky scheme as setting certain fields of radio activity in an area might be a decoy action which would serve to deflect an offensive force. This type of warfare can readily be applied by either side. It remains for the Signal Corps and its engineers to perfect sharper and keener instruments to out-radio the enemy. We may already have such an advantage, but that of course could not be told to a waiting world until the final curtain.

It is only natural that the most striking developments in the field of communications should be in radio. The Signal Corps has worked side by side with the manufacturers of every type of radio equipment



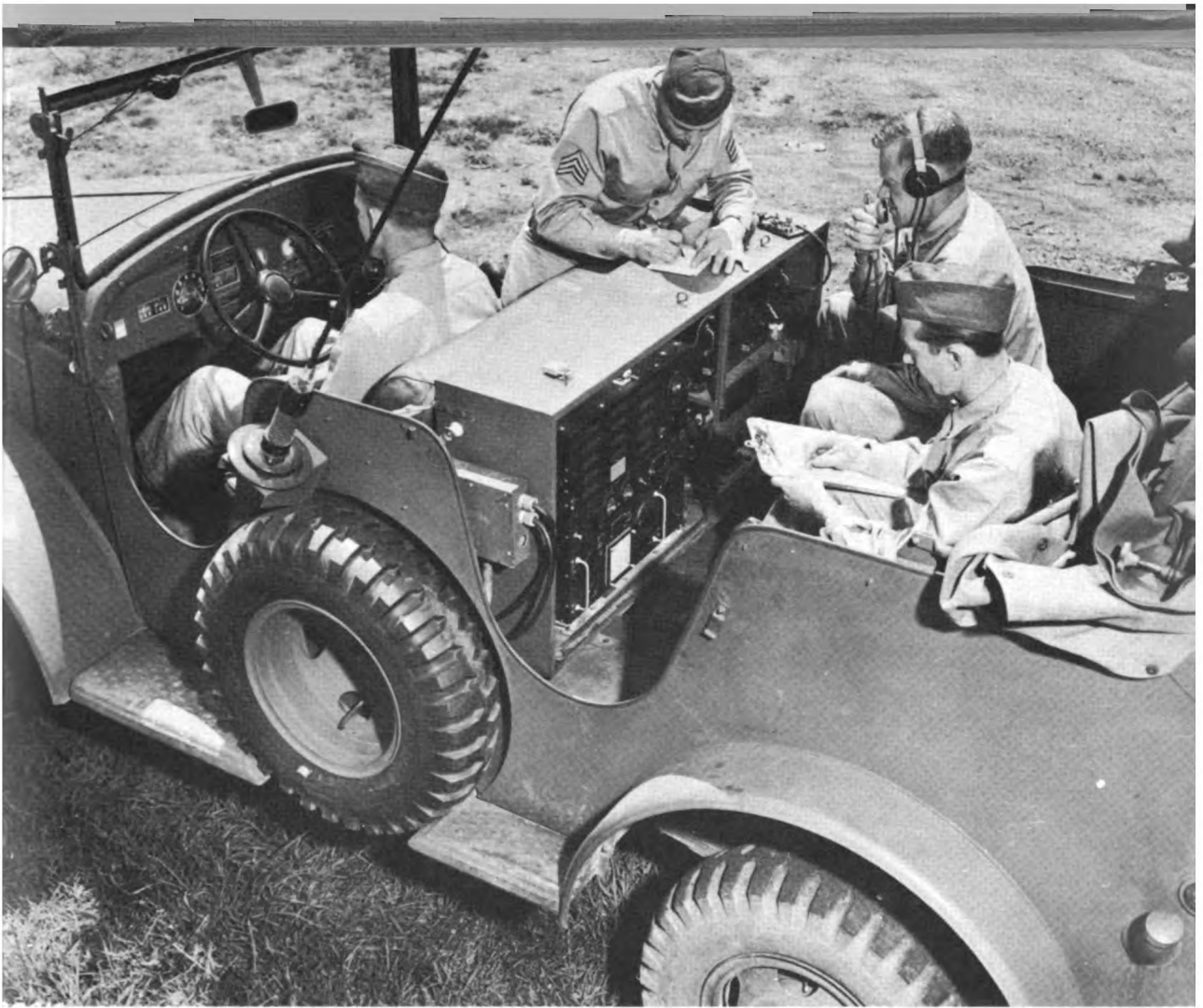
This power unit is the generator for the radios operating in the mobile message center. It may be attached to the rear of the truck carrying message center radios and equipment.

and the results, we are told, are astounding. The most amazing part of the picture may be in television. Or we may find after the war that radio, as we at home now know it, is only the beginning of a newer and more startling field called electronics. For this we will wait until the smoke of battle clears.

We do know, however, and it is verified by the Army, that a whole new series of radios with longer and more accurate range and reception have already been perfected and are in operation in the battle areas and in other places of strategic importance. Some of these sets are being used now by observers at the front to order and direct field artillery fire. Commanding officers are using other types to keep in contact with their units scattered over unbelievably large areas. In fact, the commander of an army can literally direct an entire operation from a post as far advanced as his furthestmost advance post. He no longer must stay far to the rear, where all headquarters must be maintained for greatest security.

One of the more elaborate radio sets mounted in an officer's command car can work a number of prearranged frequency channels. It is so simply operated that it is like the home push-button type radio. Another of these Army type radios may be mounted on a jeep, drawing its power from the car's electrical system through a converter. If it becomes necessary to abandon the jeep, the radio is simply dismounted and carried forward by hand, and operated from batteries.

The complexity of the use of radio is seen in records of developments which come from the laboratories. As our troops are deployed from Iceland to Panama, from Cairo to Sydney or New Delhi, and from Alaska to the Solomons, it can easily be realized that hundreds of types of radio equipment would be required. To get radios that would stand up under the heat of the desert, the frigid cold of the Arctic and the steaming tropical jungles, the Signal Corps had long



This radio-equipped scout car can travel at high speeds and keep in constant touch with its command simultaneously. Should the car be hit by a shell, its continuous stream of reports has already been logged back at the message center.

hard months of work in the laboratories working with the makers of radios. They built sets on chassis and stuck them in ovens, baked them until they were virtually charred radio hulks; they put the radios in refrigerators and froze them to the lowest possible temperatures. They pelted them with constant streams of water, all the while attempting to keep them operating, either by hand or automatically. Each tiny coil, connection, wire, tube, insulator and case had to be tested for hundreds of hours before the Army began receiving the kind of radio equipment that would stand the test. Once the elements were licked by construction of sets that would work from the equator to the poles, they still had the problem of making them rugged enough to stand up inside a tank bouncing, firing, and being knocked about by shells and collisions.

The Signal Corps engineers, working with civilian engineers, put radio sets in jeeps, trucks and machines of various kinds. They rolled them over washboard roads, over ditches and fields. They jolted, twisted and banged the radios along with the vehicles which carried them, until the radios either came apart or showed they had finally passed the test. These tests, combined with reports from the battle fronts by Signal Corps men, eventually brought about radio equipment that gave our troops the lead in communications, where the advantage is measured in soldiers' lives.

Meanwhile, as the equipment became superb, the training centers at Fort Monmouth, Camp Crowder, Camp Kohler and Camp Murphy were turning out the skilled Signal Corps soldier to make the equipment work.

However, all of the ingenuity of men in communications is not in our Signal Corps. A giant share is sprinkled throughout the ranks of the Allied armies. One little story of the fortitude of these Allied comrades of the communications arms came from Sydney, Australia.

High up in a Timor mountain hideway, four bearded, haggard Australian Signal Corps men worked over a crude radio transmitter.



The newest radio equipment is installed in this scout car. Note the operator's key mounted on top of the set. Messages may be received or transmitted as this vehicle moves across country.

Radio equipment developed by the Signal Corps in its laboratories is made adaptable to any kind of terrain or battle conditions. Here an antenna will be mounted in socket and removed when no longer required.

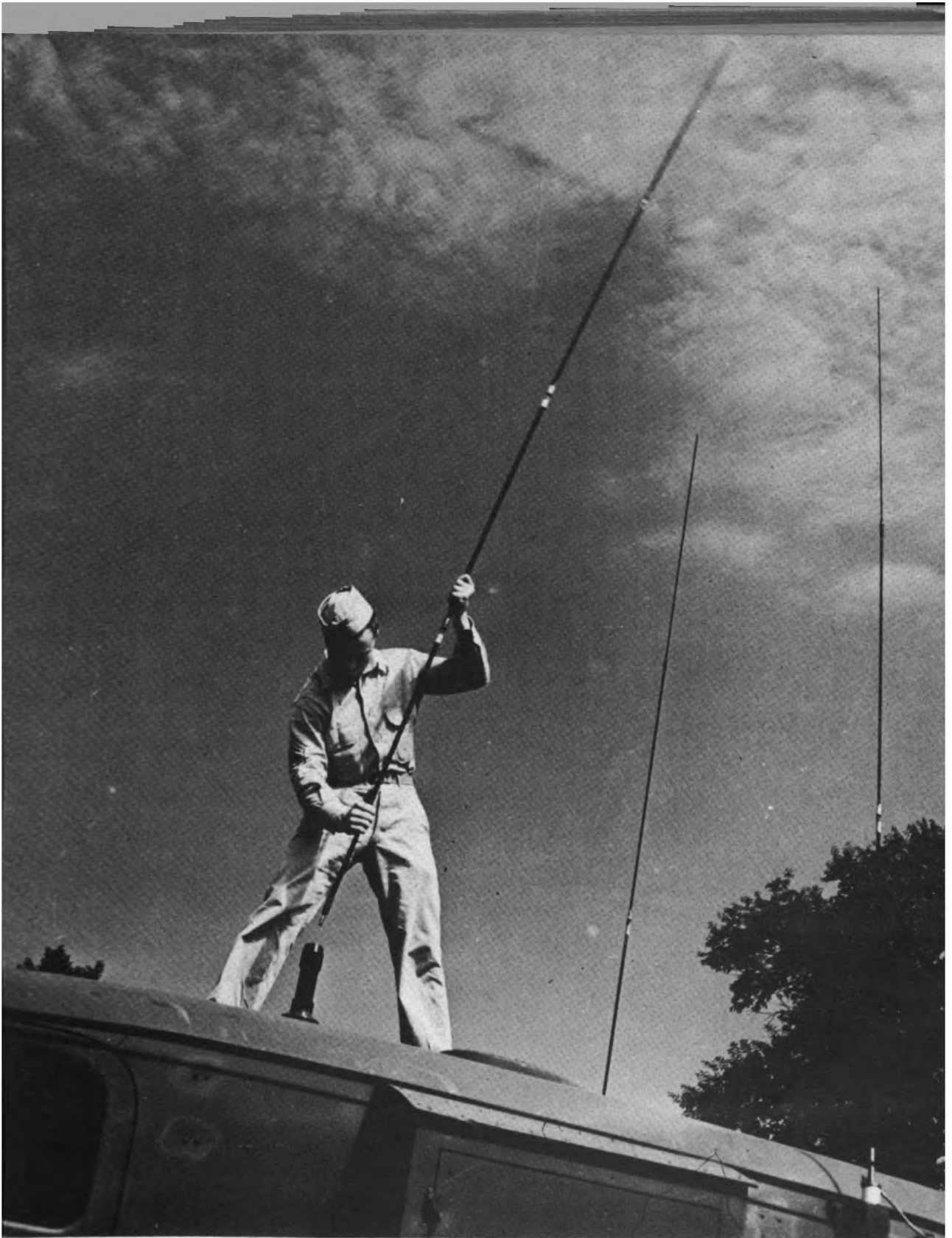


It was literally wired together with bailing wire and the men worked feverishly by the light of a pig-fat flare. One man of the quartet nervously worked a radio key while the other three men watched with anxious eyes. The feeble batteries gave wings to the signals and sent the dots and dashes across the Arafura Sea and on to northern Australia. The men hovered over the set waiting nervously but patiently for a reply, but the reply didn't come. Little did they dream that their message had reached the Australian mainland and had been passed on to Darwin. Neither did they know that all transmitting stations had been warned off the air and told to keep tuned for Timor the following night.

Thus did the magic of radio bridge an almost impossible gap and it resulted in the rescue of a group of Australian commandos who had been stranded for four months on Timor. The men had not been heard from for fifty-nine days after the Japanese took over, and their names had been listed with the missing or dead.

The only radio apparatus available to them had been brought into the Australian camp by a Dutchman who fell exhausted when he reached the camp. It was an old-style American set and was built to receive or transmit messages over a distance of a couple of miles. The sole working tools in the hands of the Australians were a hatchet, a pair of pliers and a screw driver. The queer transmitter which Joe Loveless and three other members of the Signal Corps built they later tagged "Winnie the War Winner."

It was not until these ingenious signaleers had devised a means of calibration, a receiver, and had made raids on the Japanese lines for other spare apparatus, that they saw success on the way. During the first attempts at transmission with the crude set they had no luck. The coils had been wound on bamboo sticks and they feared inaccuracy in winding might have had something to do with their failure. After they had gone to work, redesigned the set, reassembled it and tested it again, the batteries went dead. There was no charger



A reconnaissance patrol dismounts in a hurry when the enemy is contacted. They are out to get information to be radioed back to headquarters but they can fight too.

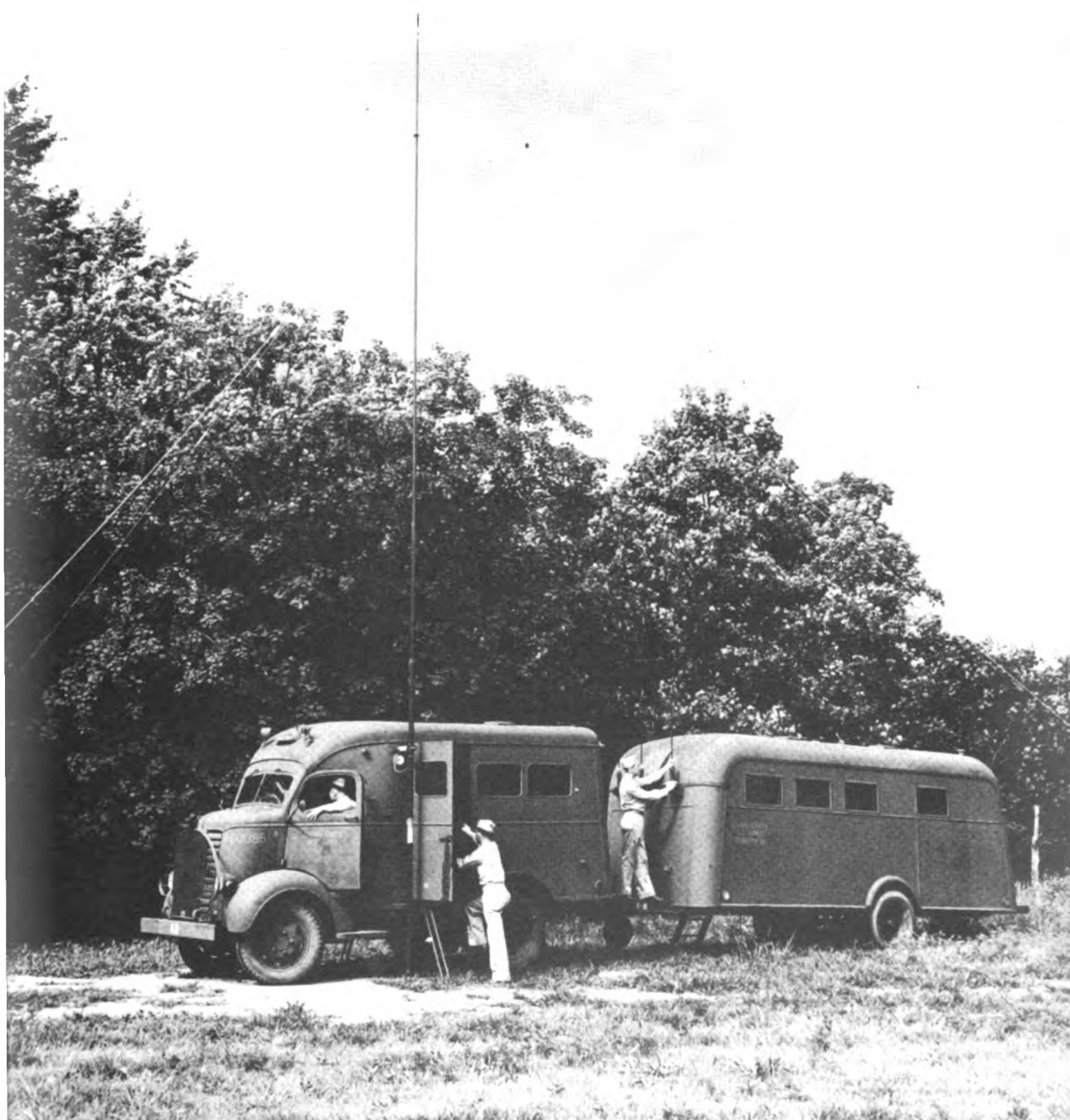
in the camp. Thus it was that fourteen of the brave commandos in the camp decided to raid the Japanese lines. This they did, and recovered a battery charger which had been abandoned in their former headquarters.

They had buried it before being driven out of the place now occupied by the Japs, and they dug it up within a hundred yards of where Japanese sentries were on guard. In a subsequent raid the commandos added to their supply of motor fuel.

Once more the men gathered around the crude home-made set. The operator pounded at the key. The little group waited, but they did not know their message had reached the mainland. On the following night, with all Australian channels cleared, the little outpost in Timor broke through the veil and established a two-way link with Darwin. The rest of the operation, which included their safe return to the mainland, was more or less routine.

When the group of commandos, with the four Signal Corps men, Sergeant Loveless, Donovan, Park and another signaleer named Sargeant, and the unidentified Dutch sergeant who had carried the materials from which the set was built over forty miles of wild Jap-infested country, reached Australia, the Signal Corps men were given the credit they were due.

Of such stuff the Allied Armies communications systems are made.



One of the newer models of the Signal Corps transmitter and generator. Especially trained mechanics, drivers, radio operators, and technicians make up the crew with these two vehicles.

ACTION! CAMERA!

THE MAJOR'S DESK WAS clean save for a few scattered papers and miscellaneous memoranda which nestled in one of the twin baskets. There was no particular need for speed that day. It was some months before Pearl Harbor, long before the battle of the Solomons and Tunisia. The Major had been called to active duty in 1940. He had been leading a rather exciting life since 1918, when he rang up a glory-draped stretch with a camera following shot, shell, and the AEF across France.

His office at the War Department in Washington was not unlike thousands of other offices occupied by more officers, old and new, called for the new job of gearing for World War II. Since 1918 the Major had been a civilian newsreel cameraman. He had been on intimate terms with Presidents, politicians, and pot-boiler actors and celebrities by the score since that memorable year of the Armistice.

But now he had a different look on his face. One could see at a glance that he was secretly hoping for frontline action again. He was like a retired fire horse resurrected from the green pastures of retirement, waiting for the harness to be clapped on and the sound of clanging bells.

This Major was proud of the Signal Corps. In fact, he'd helped make the Signal Corps. He leaned back in his swivel chair and went into a yarn about how he crawled over the rim of a trench while machine-gun fire raked the whole area.

"The hot lead was all but parting my hair," he explained non-

chalantly while recounting the early days of war films and explaining about the difficulty encountered in lugging a camera from shell hole to bomb crater and through barbed-wire entanglements. He told how he watched from a dugout a Jerry pilot whose plane was a fiery comet streaking toward the ground in a death dive a few yards in front of his shelter. There was a trace of self-satisfaction in his broadening smile and sparkling eyes as he explained how he crawled that 150 yards under a canopy of screaming shells to photograph the wreckage of that burning German plane. "Later," he continued, "they used that sequence in the filming of 'All Quiet on the Western Front.'"

War to that venerable soldier will, I am sure, never be anything but a "big story" of "Western Fronts" to cover with a camera. But the Major got his wish. The firebells clanged at Pearl Harbor and the War Department succumbed to his wishes. Somewhere a camera is grinding away at terrific world-shaking history.

Then there was spunky, youthful little Captain Jack Levien at the War Department. I would like to think that all cameramen were cut from the same stock as Jack. In the Signal Corps Reserve, he too was called to active duty. The pre-Pearl Harbor days were a picnic to Jack. He filmed maneuvers, training in the States, and reeled off any other assignments the War Department asked. He always bubbled with friendly chatter, and a ready, quick smile backed up every friendly greeting. He was a Pathé cameraman before the war and was always tugging at the bit, waiting for action. Then came Pearl Harbor, and he too disappeared from Washington.

When the stories began to come back about the invasion in Africa, Jack's story came too, by way of London from a letter Jack wrote to a correspondent and close friend there.

In the vein of high adventure the story told about his landing. He was with a camera crew, and in the battle that began with the landing of troops Jack was cut off from his men. Finally, under a

terrific barrage of shells and bombs which sank many landing boats as they fought their way ashore, Jack reached land minus the crew which had started with him. The battle had reached white-hot pitch and the wiry little cameraman found a platoon of soldiers without a leader. Their officer evidently had been seriously wounded or lost in the landing. Jack took over. There were two actions to his credit before the blazing inferno off the North African shore subsided. Jack and his fighting platoon captured an Italian armistice commission and silenced a machine-gun nest. Captain Levien is entitled to his Signal Corps insignia. He has earned it by proving he can fight as well as operate a camera.

Then there's the story of Colonel Darryl F. Zanuck, who gave up a lucrative motion-picture director's post and jumped at an opportunity to serve the Army Signal Corps. In charge of a combat camera mission with our landing forces in North Africa, Zanuck and his sturdy crew came out of the first battles in that campaign with some stirring historical film records. Although Colonel Zanuck has turned his personal diary of those first days in Africa into a book, the War Department released graphic excerpts of Zanuck's account to the press.

So intense was the fighting in the early days of the operations that Zanuck and his cameramen carried on their mission with a tommy gun in one hand and the crank of a camera in the other. In his report to the War Department, Colonel Zanuck described one hair-raising night he spent in what appeared to be a deserted hotel, only to awaken the following morning and find the hotel and surrounding territory roped off and evacuated by local authorities because two unexploded Nazi bombs lay in the center of the hostelry.

The camera record brought back by the Colonel and his men included films of both air and land combat actions, during which some of the Signal Corps officers and men participated with Zanuck



An early lesson in Combat Photography is one in setting up speed graphics such as these shown. Later it won't be so simple. They'll be clicking shutters while shells scream overhead and with bombs dropping too close for comfort.

doubling in the radio control room of a combat plane while cameramen ground out the photographic record for history.

Notable among the engagements in which he participated was the actual landing at Algiers, during which he was aboard a plane carrying Lieutenant General Mark W. Clark, General Eisenhower's second in command, and Lieutenant General Kenneth A. Anderson, commanding the British First Army. The engagement was on the afternoon of the day General Eisenhower's expedition put into Algiers harbor.

Colonel Zanuck's description of the action, taken from his log which he included in his report, follows:

"We are about 20 minutes from Algiers when the first alarm is flashed over our radio—Nazi planes ahead.

"We circle in the clouds. Sometimes it is so foggy we lose sight of our escort. I look frequently at my parachute and my escape kit. I wonder if the letter I have in Arabic, signed by the President, will work in case we have to bail out.

"Suddenly we come out of the clouds. We are over Algiers.

"We are ready to fight—all the crew at battle stations, portholes open, fingers on triggers. Below all appears calm and peaceful. Then out of a port gun hole I notice peculiar puffs of black smoke in the sky near by. Then more of the same. Then I see the flash of ack-ack coming upward from the swarm of battleships in the harbor below. Every fifth shell is a colored tracer and they make a beautiful sight.

"Suddenly planes sweep by to our left—followed by more black puffs, some quite close to our ship. Geysers of water rise into the air alongside the transports and battleships below. It dawns on me that our ships are being bombed from the air. We are flying high to avoid the ack-ack. We circle the Maison Blanche airport several times and start down. Major (now Lieutenant Colonel) Kirk Buchak, of Omaha, Nebraska, has been asleep through it all. I awaken him. We land with a thud and tumble out of the plane.

"All hell has suddenly broken loose on every side. Anti-aircraft guns are blazing away all around us. Our Spitfires rise to the attack. Dogfights fill the air. We stand like idiots watching it. A Spit gets on the tail of a Junkers 88 right over us. Black smoke pours from the engine of the Nazi plane. The crowd on the field lets out a spontaneous cheer. We cheer, too.

"Suddenly another Nazi plane lets go its load above us. We actually see and hear the bombs coming down toward us. We throw ourselves flat. Three bombs land fifty yards away. No one is hurt, but I might add Major Buchak is now wide awake. Some one yells a warning. A Nazi plane is diving on the field. I duck under the wing of our Fortress and flatten out alongside the huge rubber wheel. What fools we are—watching an air attack from the very airport that is being attacked.

"Planes now come at us from all directions. It is difficult to tell which is ours and which is the enemy's. A Nazi trailing black smoke with one motor gone dives over our heads, a Spit hot on its tail. We open fire on it.

"It is suddenly getting dark. The air is filled with tracer bullets. It looks like a Fourth of July fireworks display. A Nazi plane crashes near by. Another explodes in the air and drifts downward. We finally have enough sense to run off the field and into a slit trench, and one by one the Nazi planes disappear. We have beaten them. We have seized and held the airport."

The day after the landing in Algiers, Colonel Zanuck drew a sideline assignment. He was directed to seize and hold the Algiers radio station. With the aid of a troop detachment he carried out the assignment, and reported his greatest difficulty was in assuring its French staff that it would continue to carry on its routine functions and would continue to get its regular meals.

After completing his detail at the radio station, Colonel Zanuck reports he then set out to assemble the films exposed during the

landing attacks, climaxing this operation with the filming of American progress between Bougie and Djedeida on November 19, 1942.

"The next day," the log says, "we drove on and reached Bone at sunset. They had just had their tenth air raid in the last two days. I contacted my first group of cameramen which I had sent on by boat. They had been bombed all the way from Algiers but had some excellent material. As we ate and studied the films we were bombed time and again but no one took any notice. It is strange how quickly one becomes accustomed to air raids."

As the American forces proceeded inward, Colonel Zanuck set up field headquarters at Souk el Arba. Here an air raid caught him as he was lending a hand to casualties. Here, too, the filming party joined in an engagement in which 12 Spitfires beat off a terrific attack by 20 German Stuka dive bombers which had an escort of 20 Messerschmitts.

"Here is a sight worth remembering," Colonel Zanuck wrote in his log. "A gigantic battle royal right over our heads and not more than 3,000 or 4,000 feet up.

"How long it lasted I will never know," the log continues. "It might have been five minutes or an hour. The opposing ships dove at each other—the Messerschmitts engaging the Spits, and the Stukas bombing and strafing the airport, the city, the road, the bridges and everything else in sight.

"We had four or five cameras in action all the time. I stood by with a tommy gun, expecting a Nazi plane to unload its crew in our laps at any time. The Spits held their own and although badly outnumbered gave a good account of themselves."

The Signal Corps combat photographer is a type of soldier we hear very little about, although any newspaper reader or movie-goer seldom sees a paper or movie without witnessing some battle action recorded by him. As we watch these startling close-ups of tanks,



An aerial cameraman's job is one of the most important. His pictures tell what the bombs do to the enemy and bring back pictures quickly translated by Intelligence Officers for future action.

planes and guns in their death rattle, little do we think of the Signal Corps photographer there risking his life to bring back that history. Signal Corps and Navy cameramen and photographers today are in the front lines everywhere. They are the historians of each vital war hour. The magnificent organization and development of the Signal Corps and Navy photography is essentially a product of this war, although much camera work was done during World War I. It was not until the present war began that photographs became such valuable documents for intelligence purposes, training and technical illustration, historical records, and in the broader sense vital ammunition in the furious twentieth-century war of propaganda. Hundreds of thousands of photographs brought back by the Signal Corps and the Navy have done much to deflate and neutralize the tricky Axis photographic propaganda which has seeped by devious means into the columns of newspapers and magazines to be distributed in America.

Today no task force or army goes into action in any theater without its combat camera crew. The Signal Corps photographers are divided into two units. One is the combat photography unit, the other is the combat camera crew. One operates for the purpose of getting newsreel action. The still-picture unit gets the pictures which are released by the Army as news photos, and which are also used for intelligence purposes.

To train these men who fight with cameras, the Signal Corps has established a Photographic School at Astoria, Long Island. Cameramen originally were trained at Fort Monmouth, until the demand for hundreds of men in this field forced the move to Long Island where expanded facilities were available. The school at Astoria is devoted entirely to enlisted men of the Signal Corps. Half of the students there are trained in still-picture photography and the other half in motion-picture technique.

This training is available to men who have been classified as

photographers upon their induction into the Army and who have been assigned to either of the Signal Corps replacement training centers at Camp Wood in New Jersey or Camp Crowder in Missouri.

Candidates with the highest qualifications are chosen for special photographic training. Those selected spend about three weeks at either Camp Wood or Camp Crowder for basic military training before they are sent to the school in Astoria. The course taught by the Photographic School does not cover basic photography, because the men selected are sufficiently familiar with the fundamentals. The course is designed to adapt the photographer to Army standards of procedure and technique. Subjects are grouped under the classifications of mechanical operations, physical operations and laboratory work. The men also are instructed in Army organization.

Following completion of the course of six weeks, the Army photographer is assigned to photographic companies, each consisting of motion-picture and still-picture units. These units serve in the field or in theaters of operations overseas with corps or divisional organizations of the Army Ground Forces. A large percentage of Army photographers qualify as noncommissioned officers or as technicians in the higher pay brackets.

The combat camera school at the Photographic Center in Astoria is only a small part of the giant concentration of military film activities at the center under direction of the Signal Corps. In addition to training photographers, the center is organized for production of training films, of film bulletins, of foreign language versions and of miscellaneous motion pictures. Also, it procures and supplies production equipment and materials, and is set up to provide proper administration and operation of its varied activities.

To train its still photographers, the Photographic Center has the cooperation of the major news photo syndicates and the New York City metropolitan newspapers. When the training school for combat camera crews was established the various New York papers volun-



When this combat photographer gets back to headquarters with his film, heavy field artillery gunners may take a personal interest in the crossroads just ahead which the photographer has just caught in the lens.

teered to accept for training as many Signal Corps photographers as their facilities would accommodate, and each worked out a special course of personal instruction under the guidance of regular staff news cameramen.

Students were taught to analyze picture stories, acting in the capacity of observers. Afterward they were sent out on assignments alone or in company with regular staff photographers. Veteran New York cameramen shared generously their knowledge of making history and getting it with cameras. The city photographer's news beat is a far cry from shooting battle scenes and action where screaming shells and bombs rake the ground, but the technique in the getting, developing and rapid delivery of films is practically the same. Speed, accuracy and working under pressure are common traits of the war cameraman's and the news photographer's jobs. The method of apprenticing these soldier cameramen to news staff men has proved an effective means by which to ground these men quickly in their war assignments.

The importance of these pictorial organizations of the Army can be seen by looking at the organization. The Army Pictorial Service holds equal rank with the other three major divisions of the Signal Corps. Major General Dawson Olmstead, Chief Signal Officer, rated it so during the reorganization of the Army during 1942. Colonel Kirke B. Lawton was named Director of the Army Pictorial Service responsible to General Olmstead. To Colonel Lawton are responsible the chief of the three divisions of the APS—the Motion Picture Production Division, the Pictorial Administrative Division and the Field Activities Division. Each of these units in turn is made up of several branches. The number of commissioned and enlisted personnel engaged in pictorial work for the Army runs into the thousands, and each branch is charged with a particular and important project.

All military photographic services for the Army, except aerial

photography and ground photography connected with it, are provided by the Signal Corps. The Corps also provides all photographic equipment and supplies for the Army except those of the Air Force. The vital functions of the pictorial service of the Signal Corps are not overrated, for there are some branches of the Army which could not well operate without the Corps' aid by means of photographic services. These functions include the procurement and supply of still and motion pictures for historical records, legal evidence, training, identification, photomail service, and photographic records. In addition the Corps acts as custodian for the permanent photographic records of the Army in collaboration with the Archivist of the United States; it produces and distributes military training films, film strips and orientation films for all agencies of the War Department; acts as custodian of all foreign military and naval motion pictures, and maintains liaison with foreign attaches for this purpose. Where the service is not available in remote areas, the Signal Corps also procures and supplies photographic equipment for United States military attachés, military missions, and other individuals and agencies of the War Department. Perhaps the crowning achievement of this war in scientific development has been the Signal Corps' part in bringing the famous V-Mail out of the experimental stage in the laboratory and placing it at the disposal of millions of soldiers and their relatives at home. Importance of V-Mail can be seen when the Army says that next to food and munitions the priority for transportation overseas goes to mail.

The story of the Signal Corps training films is a dynamic chapter in the building of the Army, and that story is told in Chapter Ten.

HE'S IN THE MOVIES NOW

IN STUDIOS AT ASTORIA, Long Island, an odd drama unfolds every day with little time off for anything but hurried meals and restless sleep. The Signal Corps is making motion pictures there. Streams of actors, technicians, directors, clerks, all manner of men in uniform pour in and out of the place. Script writers and scenario writers are hammering away at typewriters. Cameras are clicking. On one set actors in uniform are going through a routine. The soldiers are making a film on how to camouflage a machine-gun nest. On another set a mechanic is assembling the parts of a truck's motor. On through the whole category of the various types of training given the man in uniform the Signal Corps goes at its work in this unique little "Hollywood" for war. The actors are under contract to Uncle Sam for the duration. Hollywood will be permitted to take up the options on their contracts when the great world picture called "Victory" is finished. The actors in this drama, however, are on a stiff assignment and the sequences being acted out in Australia, Africa and the Solomons and in the skies over Europe are coming along slowly.

Meanwhile, the Signal Corps is performing one of the greatest training jobs of the war with its film strips and training films of various kinds. Records have shown that these training films have enabled the training centers of the Army to cut the time required to train a soldier for combat something like 30 per cent, and in some instances even more.

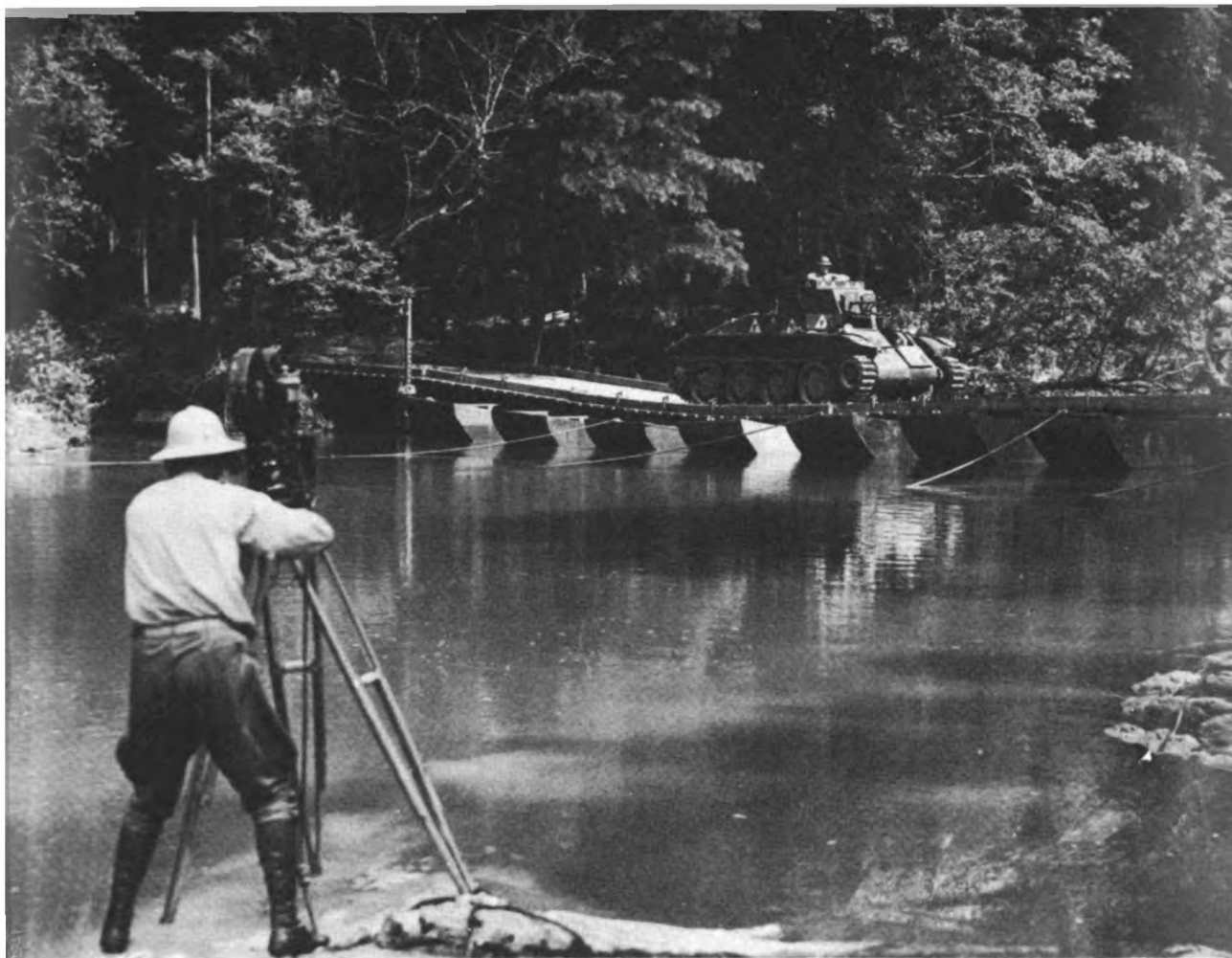
The Signal Corps soldiers who tramp in and out of the portals of Astoria's Photographic Center are not all Hollywood or Broadway actors. Most of the actors here are paratroopers, machine gunners, infantrymen, and engineers who were better than anybody else at their particular jobs while they were being trained.

They got these movie assignments because they knew more about parachuting, the intricacies of machine guns and how to use them, or knew how to build bridges, how to camouflage or do one of the countless other expert jobs which have to be done by soldiers. They are super-specialists. Thus with their assignment to the Signal Corps film center they go through the various routines in front of the camera.

This odd laboratory for war has a dramatic history. It was built in 1920 for \$10,000,000 by the Famous Players-Lasky Corporation. Here the Marx Brothers sallied through "Coconuts" and "Animal Crackers." This was where Maurice Chevalier sang and danced through such pictures as "Big Pond" and "Smiling Lieutenant," and where Noel Coward did his movie version of "The Scoundrel." A host of the movie great have tramped the sets at Astoria. Among the names found in the legends of Astoria are W. C. Fields, Pola Negri, Clara Bow, William Powell, Gloria Swanson, Richard Dix and Adolph Menjou, and on through the whole motion-picture pattern goes the list of picture stars. But all added together, the pictures they made probably could not equal in importance and value one single series of those now being turned out by the Signal Corps. These films are showing soldiers in Army camps throughout the United States how to cheat death and deliver ready-made havoc to the ranks of the enemy.

The Army says the mission of the Photographic Center is to make training films that will help to train fighting men as quickly and efficiently as possible.

The soldier actors assigned to Astoria's center sleep in a large



This particular movie shot will, when turned into reeling film, show raw recruits how the Engineers build a ponton bridge, when, where and how to form an attack on it, if it were an enemy bridge, and the film will also show new armored force soldiers how to approach such a crossing and at what speed the tank should be operating in crossing.

room which, until the Signal Corps took over, was used as a set for the filming of juke-box movies.

Others bunk in temporary barracks which have been erected beyond the lots outside of the large building. There is little difference, if any, in the other aspects of soldier life at the center. Reveille is at 6:30 A.M. and retreat at 5:30 P.M. Many of the men in uniform there are writers, directors and photographers straight from Hollywood itself, although in most instances they came by way of one of the Signal Corps replacement training centers where they had to learn how to be a soldier first. Making motion pictures is a highly technical process, whether the films are made for purposes of entertainment or for training. Thus, when the Army learned of the tremendous success of the first experimental films in turning green recruits into first-class fighting men, it was only natural that the film people from Hollywood should get these technical jobs. It would have taken the Army years to train crews who could operate as efficiently and turn out products to serve a specific war mission.

Wheels of the Photographic Center start turning when one of the arms or services, such as the infantry, medical corps or the corps of engineers, decides that one phase of its training can be taught more expeditiously and accurately at a saving of much time by the use of a training film. When the request for the film in memorandum form has been approved through the necessary channels, including the Chief of the Army Pictorial Division, the project officer at the center in Astoria assigns a writer.

The writer digs into the subject. He may require a considerable amount of research assistance and not a little study himself on the subject. He writes a script and then hands it to the project officer, who is the equivalent of what on the Hollywood set would be a producer. The project officer then assigns the camera and sound crews, and in the event animation is necessary, he outlines his needs to the Animation Department. In addition, the project officer will

recommend actors. Frequently he may decide to procure the actors from the post at which the idea of the training film originated. If such is the case, a talent scout in uniform will hop a plane and dash off to the post to pick out men who know their subject and who also can be depended on to perform with a reasonable amount of directing.

Normally it takes about six weeks from the time an idea is approved until the film is shot, cut, edited and made ready for distribution. However, if these films could be made complete in one day that still would not be fast enough. They have won the enthusiastic approval of commanders at all Army training camps, and are in great demand.

It is impossible to bring some of the heavy military equipment all the way across country to be planked down in a studio and operated while the cameras roll. Therefore the center sends out crews every week to distant parts of the United States. They make the films at the post where the equipment and other properties, plus the talent, are available.

One week a crew may be at Fort Belvoir in Virginia shooting a film on "Bridge Construction" which shows the various methods used by the engineers in river crossing. Another crew will be at the Armored Force School at Fort Knox, Kentucky, filming mad dashes of a snorting thirty-ton tank as it plows through a frame house. Still another film may be shot at Fort Benning, Georgia, to illustrate infantry tactics. All members of these Signal Corps camera crews are in the Army, and must live according to the rules of the post to which they are assigned to make a film.

When the rookies at replacement training centers see films on the screen they grasp more quickly and remember much longer the different lessons in soldiering which will be poured at them the first packed weeks of camp. Among the films shown at all replacement training centers are "Military Courtesy and Customs of the Serv-



Film being used in training men at Fort Sam Houston, Texas, gets an official inspection. Shown here are (left) Colonel Richard T. Schlosberg, Office of the Chief Signal Officer, and Lt. D. R. Williams, Visual Aid Coordinator, Headquarters, 8th Service Command, Fort Sam Houston, Texas.

ice," "Platoon Drill," "Identification of Aircraft" and "Know Your Enemy." Later, as these men progress from the basic to the later stages of military training, they see such films as "Cavalry Command," "Interrogation of Prisoners," "Theory of Motor Maintenance" and "Theory of Aerial Gunnery."

For instance, at the Armored Force School in Kentucky, when a soldier first begins to learn about tank driving he sees a detailed film which shows such basic details as the tank's controls, how to operate them, what his posture should be in the tank and the different speeds at which it should be operated over certain types of terrain.

The Animation Department at Astoria is one of the prize packages of the Signal Corps' Photographic Center. The men who used to draw Mickey Mouse and Donald Duck and other famous cartoon personalities have found a new field in guns, tanks and planes. When the Animation Department gets an order, for instance, to illustrate the operation of a radio or a telephone set it has a whale of a job. At first such a project might seem impossible. But actually it turns out in the end to be a simple picture. Regardless of how difficult the subject may be to draw or sketch, when it reaches the eyes of the student soldier in a training camp it is as simple as ABC. He watches the wave of electrical energy begin as a dot, dash or human voice and crawl along a wire through the intricate apparatus of a radio or telephone and creep at a snail's pace along the various connecting wires and coils until it reaches its destination.

No soldier wants to experience the feeling of being in a tank when it is hit by a shell and blown into a hundred flying pieces, or to sit in a dugout while a shell lands squarely on top of it simply for the sake of learning what to expect in battle. But the Animation Department helps him to a degree. With the aid of ordnance experts who furnish the data and statistics, they can draw a tank and show by live animation the action of the tank after it's struck

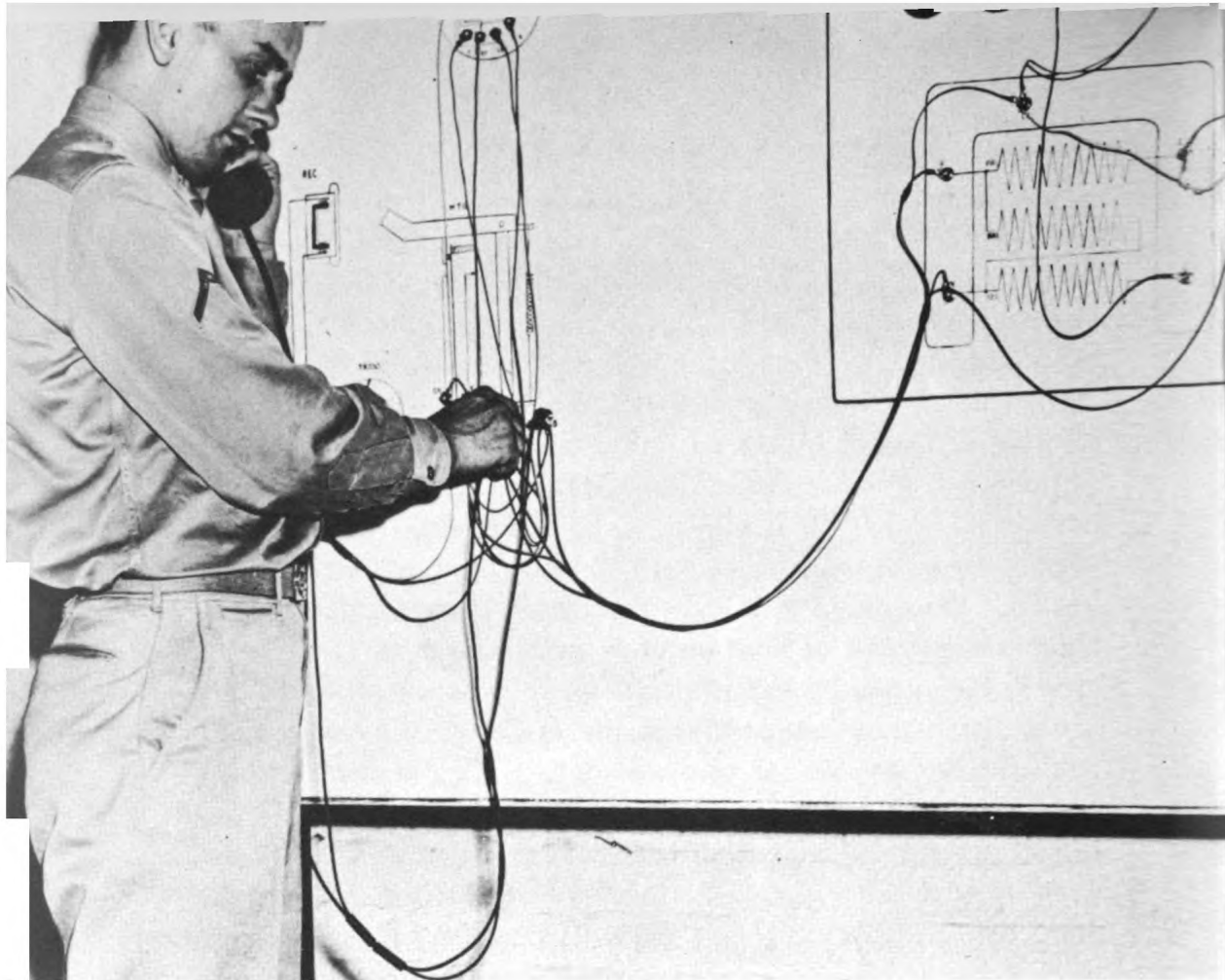


Men who once drew animated cartoon comedies in Hollywood can take a wire circuit demonstrated in this photo, bring it to life with cartoons and show new Signal Corps communications men, or electrical maintenance men in other arms and services, just how electricity works.

by a shell. With the same mechanics the Animation Department artists can drop a shell on a dugout in a pen-and-ink sketch to be filmed, and by so doing show the soldier what position he should be in if he is in the dugout and expects it to be hit at any second by artillery fire. So, through the whole schedule of war experiences and training for battle, the animation artists can prepare the soldier for what he may be expected to meet under fire.

Training films are not exactly new to the Signal Corps, for studies have been made of the subject since 1929, when several Army officers were sent out to Hollywood to study the possibility of making such films. Since that date the Signal Corps has amassed a library of hundreds of films on every phase of training now being used in the Army. In addition, through cooperation of the British Army, there has been a liberal exchange of American films for those of the British. By this means our troops have had a chance to get acquainted with the tactics, methods and equipment used by the British troops with whom they've had to fight a large share of the war to date. The Signal Corps also has dubbed in Spanish, Portuguese, Russian and Chinese languages on our films and made them available to these United Nations armies in teaching them to use the equipment furnished by the United States through Lend-Lease. Undoubtedly the advantages gained through this method of assistance have repaid the leaders of the U.S. Army manifold. In the first place, these films have probably served in the place of officers who would otherwise have been sent to give first-hand instruction in training troops of the Allied Armies.

Among the other advantages the U.S. Army has enjoyed in these training films is that of providing officers with a background in Army organization and tactics. The Signal Corps has, by means of sketches, graphs and colors, made a number of films which show the disposition of entire armies and the tactics employed by them as they moved over areas of many hundreds of square miles. Thus the



With Mickey Mouse and Donald Duck left behind for the duration this Signal Corps artist draws pictures of air compressors and other compressed air-operated tools. His drawings will come to life on the screen. Thousands of new soldiers in early training will get acquainted through film with air tools.

officer who is trained to lead men is better equipped, for he is able in this fashion to study greater aspects of strategy which were not so easily taught by lectures and textbooks.

By the same token the private in the armored force is able to see displayed on the screen the movements and operations of his entire armored force as it goes through a battle action in a maneuver with the air force, infantry, engineer and other arms.

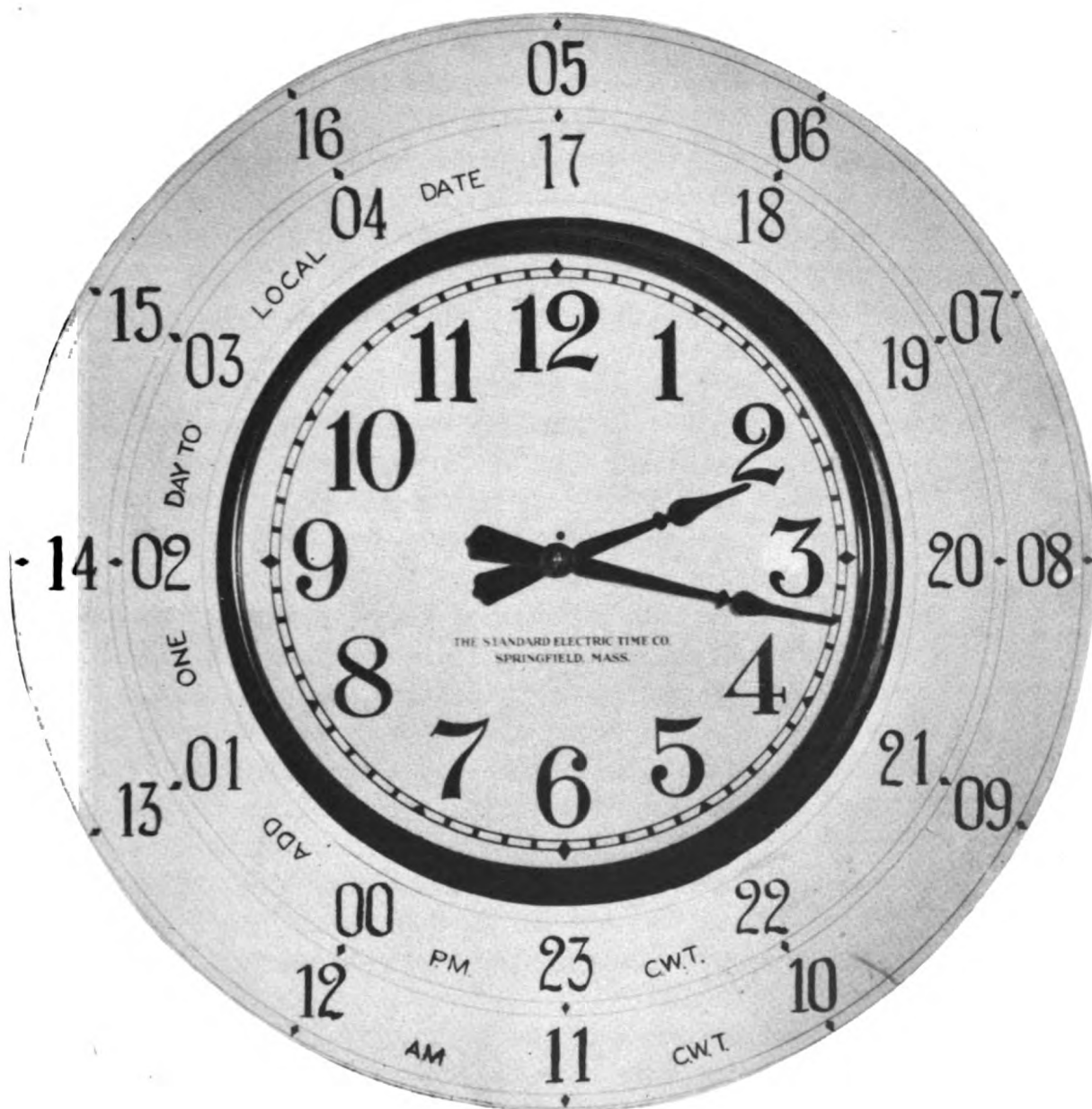
The Signal Corps is high in its praise of the cooperation it has received from the motion-picture industry in its giant film program. Many pictures for training purposes are now being made through the cooperation of the Research Council of the Academy of Motion Picture Arts and Sciences in Hollywood.

A complete story of their activities cannot be given here, but the Signal Corps production laboratory at Wright Field, Dayton, Ohio, is playing a leading rôle in the photographic phases of war. It is equipped with facilities virtually the same as those at the Astoria center for production of films and training bulletins. At Washington, D. C., another Signal Corps laboratory is operating around the clock to keep the pictorial wheels in motion for victory.

STATION W-A-R CALLING!

RADIO STATION W-A-R might well be called the brain center of the world. While our forces are hammering at the Japs in the Southwest Pacific and in the Aleutians, while the Axis forces in Europe are feeling the mighty blows that are a prelude to a liberating invasion, wires and radio keys of this giant station are buzzing with coded words—winged words from the message centers of the various headquarters throughout the world. Into the earphones of the radio operators at W-A-R in the great Pentagon Building, the War Department's and the Army's headquarters at Arlington, Virginia, just across the Potomac from Washington, come the vital messages that tell of hourly developments on every battle front.

Every army headquarters anywhere in the world has a message center. Through each of these message centers operated by the Signal Corps, pass the reports, orders and commands passed back and forth between the Chief of Staff at the War Department and his commanding generals in all theaters of war. And each of these message centers is a link in the Army communications system. The Army Signal Center, with radio station W-A-R, is the GHQ of the entire system. Millions of words speed through this amazing signal center each week. Into W-A-R come messages on every known conveyance of signals—manual and high-speed visual recording devices, radio-telegraph equipment, radio-type channels, telephone and teletypewriter network lines. All added together, these various high-



Station W-A-R operates on the 24-hour clock system. This divisional scale for employment of 24-hour Greenwich Time shows the system now in use by the Army throughout the world. Operators at W-A-R must know at a glance the exact time in any other part of the world.

speed communications devices, synchronized, coordinated and welded into a lightning speed system, represent the War Department radio net system, operated by the Signal Corps through its Army Communications Service. This latter service is one of the four main divisions of the Signal Corps as a whole. Thus its importance is readily seen.

In reality, W-A-R is not a single radio station but is the master control station for a series of high-powered stations, each of which is in turn a control center of its network. Each corps area, for example, has its net control station and the foreign theaters in turn have their own networks. The various stations connected with W-A-R operate on different wave lengths beamed to the different theaters of action in all parts of the world. It would be a physical impossibility for one single radio station, no matter how powerful, to handle all of the traffic which pours through the Signal Center. Thus in a carefully synchronized systematic flow, thousands of messages dealing with administrative problems, personnel changes, orders for movement of troops, clothing and equipment purchase orders, and hundreds of other types of messages flow through the Signal Center each day. The radio net radiating from W-A-R, besides blanketing the United States, stretches to Alaska, Puerto Rico, Hawaii, Panama Canal Zone, and to our leased bases in Greenland, Iceland, Bermuda and the West Indies. As our armed forces are deployed around the world other points become links in the radio net system.

Major General Dawson Olmstead, Chief Signal Officer of the Army, is charged with the responsibility of keeping the Army communications system in operation. The Signal Center itself, with W-A-R, is operated by the Traffic Division of this system. The Traffic Division is directly in charge of Colonel Edward F. French.

Until 1943 the Signal Center was known as the War Depart-

ment Message Center. It was established in the Office of the Chief Signal Officer in Washington on March 23, 1923, when radio as a communications device was first getting out of knee pants. The War Department radio net at that time was going through the first stages of organization, although two years before radio telegraph stations had been installed by the Signal Corps at most of the Corps Area (now Service Command) headquarters, with the master control station in Washington. About the same time smaller stations were being set up at many of the camps throughout the country to provide a means of communications in the event of an emergency. Some 70 stations were included in the War Department radio net by the end of 1922. By 1929 the number had been increased to 212. The network then had expanded to cover Army posts, linking them with their respective Corps area headquarters. The Corps area headquarters were in turn connected with the War Department in Washington through the net control station, whose call letters were at that time WVA.

Before 1923 most of the War Department's communications traffic had been handled by a civilian agency not connected with the Signal Corps, and known as the War Department Telegraph Office. But with the organization of the Message Center in 1923 this office was incorporated into the Signal Corps, which resulted in a saving of many thousands of dollars monthly, not only to the War Department but many government agencies. There are now about fifty government agencies in Washington routing their messages through the Army system to points throughout the world.

With the organization of the Message Center, the Army had an opportunity to train engineers, operators and maintenance men who were to become so valuable with the emergency in 1942. During many disastrous floods, hurricanes and storms during peacetime, the Army's communications system operating from the Message



These hundreds of reels of cable for communications lines will link together the telephones, teletypewriters and telegraph instruments at military installations. Signal Corps men will do the job.

Center in Washington has been the sole coordinating communications system until lines and facilities could be restored in the stricken areas.

No group of experts in communications anywhere in the world rank higher than the many skilled Signal Corps men who sit at radio keys and various sending and receiving devices which take in and toss out their millions of words at the speed of light. These men are the finest of the finest in the Corps. The call to W-A-R for one of these men from some training station of the Signal Corps means he has "arrived." If he is a radio operator, a teletype-writer operator or maintenance expert, he can truly say that he has earned the right to wear his cross-flagged insignia with unbounded pride. For these men at W-A-R and of its system of network control stations literally keep the radio key fingers on the pulse of this war-tossed world. When news of a crumbling defense line or a crowning victory on the battlefield trickles across the ether waves toward headquarters in Washington, these Signal Corps men are the first to pick the message out of the air, or off the wire lines. Upon their accuracy in sending and receiving may depend the lives of thousands of men of a division, a convoy, or an army.

It is an organization in which every man is tops. The common garden variety of ham radio operator with his attic set may send a message at around fifteen words per minute, or perhaps twenty at best, for a short period of time. But the radio operator on duty at W-A-R must send or receive, or both, at a rate of more than fifty words a minute. And he must do this for eight hours at a stretch, not just for half an hour or so at a sitting.

In addition, he must know every quirk and mechanical operation of the delicate equipment, such as teletypewriter, radio types, and siphon recording equipment, and if necessary be able to make repairs on the spot. He must be trained to read manual signals at more than thirty words a minute, and to handle traffic at the same



Control planes of Radio Station W-A-R. Virtually every point on the globe is at the fingertips of the men in the crack radio and teletypewriter corps who can man the dials and keys here. Competition is keen in the Signal Corps for a tour of duty at this important post. W-A-R is the Communications Arm of the General Staff and control center for the entire Army Communications System.

speed if required. From a recording tape he must be able to read at more than fifty words per minute and also operate a teletypewriter machine if he is so assigned.

When these operators come to the War Department to take over a radio desk or a teletypewriter assignment, they do not come to settle for the duration. They serve a tour of duty, and when another theater of operations is opened the commanding officer of the Signal Center looks down the line. He selects five or six of his finest operators and maintenance men, puts them on a plane and off they go to Australia, the Solomons, India, Africa, England or South America to take over the new message center. Wherever they go these men are a select corps of the Army. They are only an extension of the highly geared Army communications system. They truly take pride in their assignments.

On the morning of December 7, 1941, these Signal Corps operators, hunched over their keys with earphones tightly clamped to their ears, did not reflect startled countenances. They had snatched the vital storm warnings out of the ether for days prior to Pearl Harbor as the taut, cryptic Army flashes flowed through the Signal Center. Within the hour after the first flashes of the attack rippled off radio receivers this giant radio beehive was whirring at full speed. There was no excitement, no mumbling or off-the-record comment. The momentum which had been a low steady hum throughout the center gradually quickened and reached a steady staccato rhythm. Emergency operators were quietly but quickly called in.

The operators and cryptographers calmly trooped in one by one, seated themselves at their desks, clamped on earphones and tuned their sets to carefully prearranged channels of the networks they handled. Within that first hour after the Japs struck, traffic into the Signal Center tripled. It kept increasing in intensity as hour after hour was ticked off. Instructions and orders were whipped in and out of the center to and from every American Army unit around

the circumference of the globe. All through the day on December 7, on through the night and through the early hours of the next morning these men stayed at their teletype keyboards and code desks relaying the words of the high command. These words were being translated into action in the seven seas and on land from the farthest outpost in Alaska, the Philippines, Hawaii and Panama, and to military attachés in every foreign land.

Said Colonel French, chief of the traffic division, who directs the Signal Center: "The Signal Corps can be proud of its men on duty here. They performed their work in a most efficient manner. There were no heroics, no rushing about. Everyone was calm, cool and collected. The job was done diligently and well. They swung into their work and kept going without a letdown."

Of all the personal scores this crack communications corps has to settle with the enemy is one particular one with the Japs. It is woven indelibly in the memories of these fighting Signal Corps operators in a story of one of the operators who went down pounding a key at Fort Mills in Corregidor during those last fateful hours the Japs were blasting the rock into a battered ruin. Deep down inside Corregidor was the Fort Mills message center. The operators there had been hammering out messages for days, hoping until the end that some fleeting spark darting from their radio receivers would carry a ray of hope for relief.

The operators were dropping away from their keys at this heroic last-stand message center. Some were falling from exhaustion and others from starvation. Many were too weak to press the tiny instruments that would fire a radio signal across the war-raked Pacific to Hawaii. However, there was one Signal Corps operator there from Brooklyn, a sergeant, who was perhaps endowed with a little stronger physique that would stand more punishment than his fellow operators, for his were the last direct signals to come from the besieged fortress.

Signal Corps operators at Fort Shafter in Hawaii stayed at their radio sets minute by minute during Corregidor's last hours, trying vainly at times to catch the faint signals from the Philippines, and flash them on to the Signal Center in Washington. Finally, on May 5, Sergeant Irving Strobing's message was caught by the Fort Shafter operator as it began coming through.

"Fort Mills (WVDM) radio operator to Fort Shafter (WTJ) radio operator," the message went as it buzzed in code into the receiver at Fort Shafter. The interpolations are the War Department's. "They are not near yet." (Probably refers to the Japanese troops in landing boats, preparing for the assault.) . . . "Waiting for God only knows what . . . How about a chocolate soda? . . . Not many . . . Not near yet." Reception was poor at Hawaii and there was a lull for a few seconds as the Fort Shafter operator tried to clear up the signal. Three hours later contact was again established. "Lots of heavy fighting going on," the message said as the signal faded out. Then six hours later the Fort Shafter operator again picked up the signal: "We've got no time to waste, can you take it or not?" (Refers to code message that he wished to have forwarded to the War Department in Washington. Strobing was radioed back that his signals were too weak. Much of his radio antenna had been shot away.) "We will send through Navy." (Navy communications group were located in the tunnel adjacent to the Army's.) "We've only got about one hour and twenty minutes before . . ." (May refer to estimated time when the garrison must surrender.) Then about twenty minutes later the message resumed from Strobing in Corregidor. "We may have to give up by noon, we don't know yet. . . . They are throwing men and shells at us faster than you can count." Fifteen minutes later the message began trickling through the receiver at Fort Shafter again. "We've got about 55 minutes and I feel sick at my stomach. I am really low down. They are around now smashing rifles." (Probably refers to our troops



Close individual instruction aids these students learning to receive code. Here they use pencils to record messages. Later they will learn typing simultaneously with code sending and receiving.

blowing up the big guns to prevent them from being captured.) "They bring in the wounded every minute and it is a horrible sight. [We will] be waiting for you guys for help. [That is the] only thing [I] guess [that] can be done. General Wainwright is a right guy and we [are] willing [to] go on for him, but [I] guess he knows what's best all around. Well, I can't see much from here. Shells were dropping all night. Faster than . . . Damage terrific. It [is] too much for guys [to] take much around. Enemy heavy cross shelling and bombing. They have us all around and from skies." The signal faded and then was picked up again about fifteen minutes later. "From here [it seems that] firing has ceased on both sides. The men here are all feeling bad, because of the tremendous nervous strain of the siege. . . . Corregidor used to be a very nice place, but it's haunted now. It has withstood a terrific pounding." During the next hour the message came through intermittently in short dashes.

"They just made broadcast to Manila to arrange meeting for surrender. Talk made by General Beebe . . . I can't say much . . . Can't think at all . . . I can hardly think . . . Say I have sixty pesos you can have this weekend. The white flag is up . . . [Everyone is] bawling like a baby. They [are] piling soldiers." (His dead and wounded comrades were being carried into the tunnel where the signal communications personnel were at work.) "I'm vomiting . . . Arms [are weak, from many hours and days, on duty, with but little rest and on short rations] . . . I am very tired. I know now how a mouse feels, caught in a trap, waiting for you guys to come along and finish it up. . . . I've got a treat . . . a can of pineapples. Am opening it with a TL-29 [Signal Corps knife]. My name is Irving Strobing. Get this to my mother, Mrs. Minnie Strobing, 605 Barbey Street, Brooklyn, NY. . . . They [are] to get along OK. . . . Get in touch with them as soon as possible. . . . My love to Pa, Joe, Sue, Mac, Carrie, Joy and Paul . . . Also to



This Signal Corps soldier is motor maintenance man. Many heavy vehicles are required to move Signal equipment; thus there must be mechanics and drivers. Here Signaleer makes repairs at night. His jeep has reversible head-lamps.

all family and friends : . . God bless 'em all and hope they will be there when I come home. . . . Tell Joe, wherever he is, to give 'em hell for us. . . . My love to you all. God bless you all and keep you. Love. Sign my name and to my mother how you hear from me."

(The Fort Mills operator's last stand-by signal was sent at 18:07, May 5, Hawaiian wartime. For the next several hours, the radio operator at Fort Shafter continued to call him and to listen for his signals, but no answer was ever received. Their instruments and codes were probably destroyed—as were the Navy's—to prevent them from being captured.)

The War Department, in a news release in April, 1943, reported that Sergeant Strobing was a prisoner of Japan. Sergeant Strobing is waiting for "you guys to help." It has been a long hard row on every world front since Corregidor's fall, but the Signal Corps has vowed that its thousands of men will one day, perhaps not too distant, be there to "help." Perhaps Sergeant Strobing will send back his first message from his own radio key at an Army signal center in Tokyo.

MESSENGERS WITH WINGS

THE SIGNAL CORPS LOST the Air Force when it was a fledgling, six months before the Armistice, in World War I. But the Corps still has an air fleet. They're all single-engined jobs, and they have feathers on their wings instead of metal fabric. They fly high and fast and they get home without flying the beam. Their navigation instruments are tiny brains with a sixth sense—if pigeons have a sixth sense which tells them where they must land. Already in this war pigeons of the Signal Corps and many of those faithful winged messengers of the British Army have earned their campaign ribbons.

In August, 1942, when boats of the British invasion force snaked their way through the treacherous mine fields of the channel en route to Dieppe, there were pigeons aboard each vessel. All radios were silent. There were no signs of visual signals in any quarter, but every few minutes, as a boat ran into a patrol, or trouble of any kind, a pigeon took off from the boat with a message. Back the pigeon flew to headquarters with details. The intelligence office followed the progress of troops until the necessity for radio silence was no longer required.

In Tunisia when American forces were driving ahead to knock out Gafsa, then an important objective, the news was first carried through to our headquarters by homing pigeons with our troops.

The history of the pigeon in war dates back even to Roman times. According to earliest accounts, Brutus sent one of his pigeon mes-

sengers to the Consuls for aid when he was besieged in a city by Mark Antony's forces. History also contains accounts of the Saracens using pigeons during the Crusades until the pigeons were downed by hawks loosed by the Christians. In 1573 William the Silent is said to have used pigeons as messenger carriers during the siege of Haarlem. And hawks were used again by the Germans to knock down pigeon messengers while the Germans hammered at Paris during the seige of 1870.

It was in 1878 that the United States Army tried its first experiment with pigeons. A number of birds were sent to General Nelson Miles, then a colonel of the 5th Infantry, in Dakota. He tried to train and use them, but without success, and reported that the failure was due mainly to the fact that the region was infested with hawks which killed many of the pigeons.

In 1888, a pigeon loft was established by the Army at Key West, where a number of experiments were carried out. While they proved partially successful, the results were not wholly satisfactory and the loft was discontinued and experiments were dropped. During 1897, many trials were made with homing pigeons in the United States Navy, especially by Admiral Sicard, and considerable success was attained.

Signal officers recommended the use of pigeons in the American Army as far back as 1878, and during the first World War the French, British and German forces used pigeons with much success. With the entrance of the United States into the war, homing pigeons became an official component of its Signal Corps for the first time. A personnel of 4 officers and 324 men of the AEF operated a network of pigeon communications containing between 7,000 and 8,000 birds. Many important military communications were handled, and nine messages were efficiently carried for the "Lost Battalion," preventing its annihilation. After the war, pigeon activities of the Signal Corps were centered at Fort Monmouth, where breeding and



This student is listening to code coming off tape recorder. Code is automatically written on the tape as it comes in. Operators at Message Centers often are too busy to receive some traffic, thus these machines do the job. Messages not marked "rush" can be transcribed when burden of urgent traffic lessens.

Here a class is getting instruction and code practice. They are receiving radiotelegraph code from automatic machine. Note the switchboard. Instructor can plug in circuits for some men who can take faster code while slower speeds can be "plugged" at the board for those not so apt at catching on to dots and dashes.



training lofts were established. The principal aims of the pigeon section were to maintain pigeon service in peacetime, to develop and perfect the Army's strain of homing pigeons through experiments, and to train officers and enlisted personnel for duty in pigeon organizations. As the result of these experiments, the pigeon today in the Signal Corps is considered 50 per cent stronger and has more endurance than those of World War I. During the years after the war the Air Force often made use of the birds when planes flew over remote areas, especially in Latin America, the Philippines and Hawaii, where communications facilities were sparsely distributed.

Approximately 2,000 pigeons were being maintained by the Signal Corps in 1941. There were at that time 12 officers and 360 enlisted men directly connected with the work. The Army has not released recent figures on pigeons in service with American forces, but the British in England alone have 750,000. When England first entered the war she had seen some of the tricks used by the Nazis in France and in the Low Countries. So one of the first security measures in England was taken when the government ordered all pigeon lofts searched and all pigeons freed. Thus any spies lurking in England with hopes of sending a pigeon back to Germany with a message were caught short. The British have gone even further in using pigeons for war service. Pilots flying over the occupied countries drop specially designed cages with their pigeons. Each cage carries a written request for information on military installations or German army movements, factories or munitions dumps. If the pigeon falls into friendly hands a message is written, placed in a capsule, and away goes the pigeon back to England with the vital information. In a couple of days the Germans are often taken unawares at the accuracy of bombs guided by the subjugated ally and the go-between pigeon.

Pigeons are used in combat areas when there is a necessity for radio silence, and in the absence of field telephone wires. For in-

stance, a soldier several miles ahead of a command post near the front may not wish to use his handie-talkie radio set for fear enemy radio-locators will pick up his position. He writes a message or draws a small map with symbols and sends it by pigeon back to headquarters. The information is safely transmitted without endangering the lives of all men in the reconnaissance patrol.

Pigeon handlers are mostly recruited from among enlisted men who have been pigeon fanciers in civilian life. The handlers must get acquainted with each bird and learn its habits and characteristics to make rapid progress in training it. For pigeons, it seems, have characteristics and personalities just as humans have, and different birds are fitted to do special jobs. Some are speedy for short distance flights, but not so dependable for long flights. Others can always be depended on to get to their destination.

One bird named Molly, at Fort Bliss, Texas, flew 82 miles in 78 minutes, which is pretty fast traveling. Statistics do not say whether Molly was hungry, or lonesome, or had a tailwind. Anyway, she chalked up a good record. Normally, pigeons fly from 35 to 40 miles per hour. Some have been known to reach a speed of 75 miles per hour for a short distance. However, dependability rather than speed is the trait Signal Corps soldiers try to develop. The character of the terrain is studied carefully when pigeons are used, since the birds reflect a tendency to sidetrack mountains or high hills. Instead they will do a wing over and fly through a mountain pass. Some trainers say this is because the pigeon dislikes the downdraft usually found between high mountains. However, the pigeoneers at Fort Bliss say there are records of pigeons having flown over obstacles 7,000 feet high and delivering a message at a point 210 miles from the starting place. Some pigeons can fly for as much as fifteen consecutive hours, and authorities state that a pigeon can cover 700 miles in a single day without rest.

There are two classes of the homing pigeon in the Signal Corps.

One is trained to return to a stationary loft. The other is trained to return to his loft wherever it may be moved. The reason for this is the new mobile loft which the Army has been using in recent tests. For the training of pigeons with mobile units the rolling loft is moved a short distance across country every two or three days. It requires from twelve to twenty-four hours for pigeons to resettle themselves in a loft moved to a new location. After the specified number of hours has elapsed, the pigeon is ready to go to work again.

The portable loft is readily adaptable to the Army's mechanized units, for it can be moved over the same terrains. It has been found, however, that pigeons operating from a stationary loft can perform their mission over a longer distance. Evidently the pigeon is willing to take a chance on a longer flight if he is sure he knows positively where he is going.

According to the Signal Corps' pigeon authorities, pigeons are among the most intelligent birds; and it is an interesting fact that a pigeon will not change its loft or mate voluntarily.

In breeding pigeons for message service, eggs are laid after a week or ten days' time in a new loft. The eggs hatch about the seventeenth day, and by the twenty-eighth day the young pigeons, called "squeakers," are out of the nest. Training does not begin, however, until the bird is about two months old.

The pigeoneers begin the job of training the birds before they can fly. They take them directly from their nests and give them lessons in eating. Then as the wings grow stronger, the birds are permitted to take short flights each day. Simultaneously, those birds assigned to mobile lofts have their homes moved each day a distance of twenty miles. When three weeks have elapsed, the loft is then put into a permanent position and the birds begin carrying messages as far as sixty miles. Experimental tests made by the Signal Corps and the Air Forces are constantly adding to the practical value of the pigeon. During these tests pigeons have been dropped

from altitudes of as much as 25,000 feet while the plane flew at 350 miles an hour, without any ill effects to the pigeon, and it is to be remembered that the temperature at this altitude ranges in the neighborhood of 50 degrees below zero. Obviously the pigeon doesn't stay in that altitude. He probably does a neat power dive for several thousand feet before he sets his course for his home loft.

The British pilots take pigeon passengers regularly on their flights over Europe, and it is supposed that the Americans now do likewise. If the radio in a plane is shot away the plane can still make periodic reports on its progress by releasing the pigeons with messages at intervals during the flight.

Many RAF men have already credited pigeons with saving their lives. One of the last reports was of "Winkie," attached to the crew of a Lancaster bomber forced down in the North Sea. "Winkie" returned to the home loft in Dundee, Scotland, with a message tied to its leg. The nine crew members of the bomber tossed about in the North Sea on a rubber raft for a day. The pigeon had flown 350 miles for help, and the help arrived in time.

The pigeons are at war closer to home than on the coast of Europe. Now, planes patrolling our coast lines along the Atlantic and Pacific carry these feathered messengers. Often it may be desirable, when one of these planes spots a submarine off our shore, to keep a radio silent until a message is dispatched by pigeon, to keep the sub from learning that it has been spotted. The pigeons carried by our fliers on patrol wear leg bands with numbers registered at certain Signal Corps installations. If a plane is downed either by enemy action or some mishap, and the pilot has not time to write a message, the mere arrival of the pigeon at its home loft would set the wheels of a search and prompt aid in motion.

The pigeon has joined the paratrooper too. He can take the pigeon

Before tackling simplest repair job, Signal Corps technicians must master the use of common tools. This class is learning technique of operating a blow-torch.



down with him when he leaves the plane and send back a message without giving away his position by use of radio; or pigeons may be dropped to him after he lands.

But as the Signal Corps learns more and more about pigeons and how to use them more effectively in modern war, so do the Axis armics learn. The Signal Corps therefore is working just as patiently on methods of bringing down enemy carrier pigeons, although that is a cruel term to apply to such a harmless creature as a bird. At Fort Monmouth, for instance, one of the fleet of fighting falcons of the Signal Corps goes by the name of Thunderbolt. The Signal Corps has gone so far as to predict that Thunderbolt and his pigeon-blitz squadron may even be utilized in the not-too-distant future to power-dive on enemy parachutists and rip their chutes to shreds. A chute in shreds leaves nothing for the parachutist but a death-dealing landing.

HISTORY OF THE SIGNAL CORPS

THE STORM WARNINGS OF the Civil War probably swept the Signal Corps to life, although Samuel F. B. Morse in the 1830's, tinkering with his telegraph instrument, very likely generated the spark of the Corps' beginning. Until then signaling on land had not been the subject of much serious study. In the Revolutionary War most messages went by the Paul Revere method, on horseback, or else a soldier simply tucked the message under his arm and ran like the devil, perhaps until he dropped and someone else picked up the message and ran on, until it finally reached headquarters or its destination.

However, if we really dig into history for some early records of signaling we find that a simple system of visual signals for the transmission of important news between neighboring cities was known to the ancient Greeks. A code described by the historian Polybius (204-122 B.C.) enabled them to signal each letter of the Greek alphabet by means of the display of a certain number of lights to the right or left of a fixed central position.

While instances of transmission of warning messages by lights and other visual signals can be found throughout history, and the use of visual codes between ships at sea has been practiced by mariners for several centuries, little progress had been made in developing methods and instruments down to the middle of the nineteenth century. That is, if we except the American Indians, who got to be pretty accurate at spotting wagon trains crawling

across the prairies of the West, then telling the next band of tomahawk wielders on the hill several miles away by means of smoke signals. Indeed, the pioneers and scouts who had to travel between the Alleghenies and Rockies developed a healthy respect for the Indian signal corps, or the Indian grapevine, which was second best.

But in a military sense, when Samuel Morse between 1832 and 1835 finally got his telegraph set to work, soldiers began giving land signaling more than cursory analysis. It was a young man born September 20, 1827, just before Morse's instrument came to life, who was to put the Signal Corps together piece by piece.

Albert James Myer was born at Newburgh, New York. The records say he served an apprenticeship as a telegraph operator and then entered Hobart College, Geneva, New York, from which he was graduated in 1847. From early youth he had exhibited a leaning for artistic and scientific studies. Upon leaving Hobart College he entered Buffalo Medical College, and four years later he received the degree of M.D. Evidently, as a doctor, Myer was more interested in bringing ideas into the world than infants, and he obviously found more satisfaction in mending and putting together ideas than in doing the same for human bodies. For it was said of him "that he was specially noted for the manner in which he could take hold of an idea or principle, and, following it to its length and breadth, develop all there was in it or of it." His graduation thesis did not bear an impressive title, nor on the surface did it offer much promise. It was entitled "A Sign Language for Deaf Mutes." Nevertheless, military men say it contained the germ of his visual signaling system which with some improvement served to link together thousands of soldiers scattered over hundreds of thousands of square miles of battle area.

After practicing medicine for three years, Doctor Myer was commissioned in 1854 an assistant surgeon in the regular army and ordered to New Mexico for station. His attention had been previously

directed to the desirability of devising a simple system of visual communication, and during his leisure hours at his isolated post he devoted himself to its development.

In 1856 he drafted a memorandum on a new system of signals and obtained patent letters on it. Two years later the War Department recognized the possibilities of his proposed system by appointing a board to examine "the principles and plans of the signaling, mode of use in the field, and course to be pursued in introducing to the Army."

One of Myer's assistants in demonstrating his system to the board was Lieutenant E. P. Alexander, Corps of Engineers, who, on the outbreak of the Civil War, organized the Confederate Signal Corps. For three months they experimented with flags, torches and glasses between Fort Hamilton, New York, and Sandy Hook, New Jersey, and in January, 1860, reported to the War Department what has since been known as the wigwag system. In his annual report for 1859, Secretary of War Floyd commended Surgeon Myer's system to Congress, and as a result an initial appropriation of \$2,000 was made "for the manufacture or purchase of apparatus and equipment for field signaling." The same Act authorized the appointment on the staff of the Army of one signal officer with the rank, pay and allowances of a major of cavalry. Pursuant to this authority, the following appeared in General Orders No. 17, July 2, 1860:

"Signal Department, Assistant Surgeon Albert J. Myer to be Signal Officer, with the rank of Major, June 27, 1860, to fill an original vacancy."

This is the first official record of the Signal Corps' beginning.

Two weeks later Major Myer was ordered to report to the commanding general, Department of New Mexico, for duty. The War Department also directed that two officers be detailed for signal duty as assistants. A campaign against hostile Navajos was being

planned. During the campaign, which lasted several months, an extensive test of this new system, using both flag and torch, was conducted. The first type of flag was of a solid white color, although the use of a black diagonal to distinguish it from a flag of truce was suggested. At the conclusion of the Navajo expedition the department commander, Colonel Fauntleroy, stated that "the services of the signal party have been valuable in the operations against the Navajos and have conclusively demonstrated not only the practical usefulness of field signals, but that they can be used under any of the contingencies of frontier warfare." Lieutenant J. E. B. Stuart, later famous as a Confederate cavalry leader, tendered his services in October, 1860, to aid in signal instruction.

The time had now arrived for a use of military signaling more extensive than its inventor had imagined. In May, 1861, Major Myer was ordered to Army headquarters and on June 10 a Signal School was formally opened at Fortress Monroe, Virginia. The Confederates also saw the merits of field signaling, and Alexander, now captain in the Confederate States Engineers, reported as signal officer on General Beauregard's staff and developed a system of signals in time to be of material assistance during the first battle of Bull Run.

Immediately after the Bull Run campaign Major Myer submitted plans for the organization of a separate Signal Corps to "have charge of all telegraph duty in the army." Simultaneously, he proposed a "telegraph and signal train to accompany the army on the march."

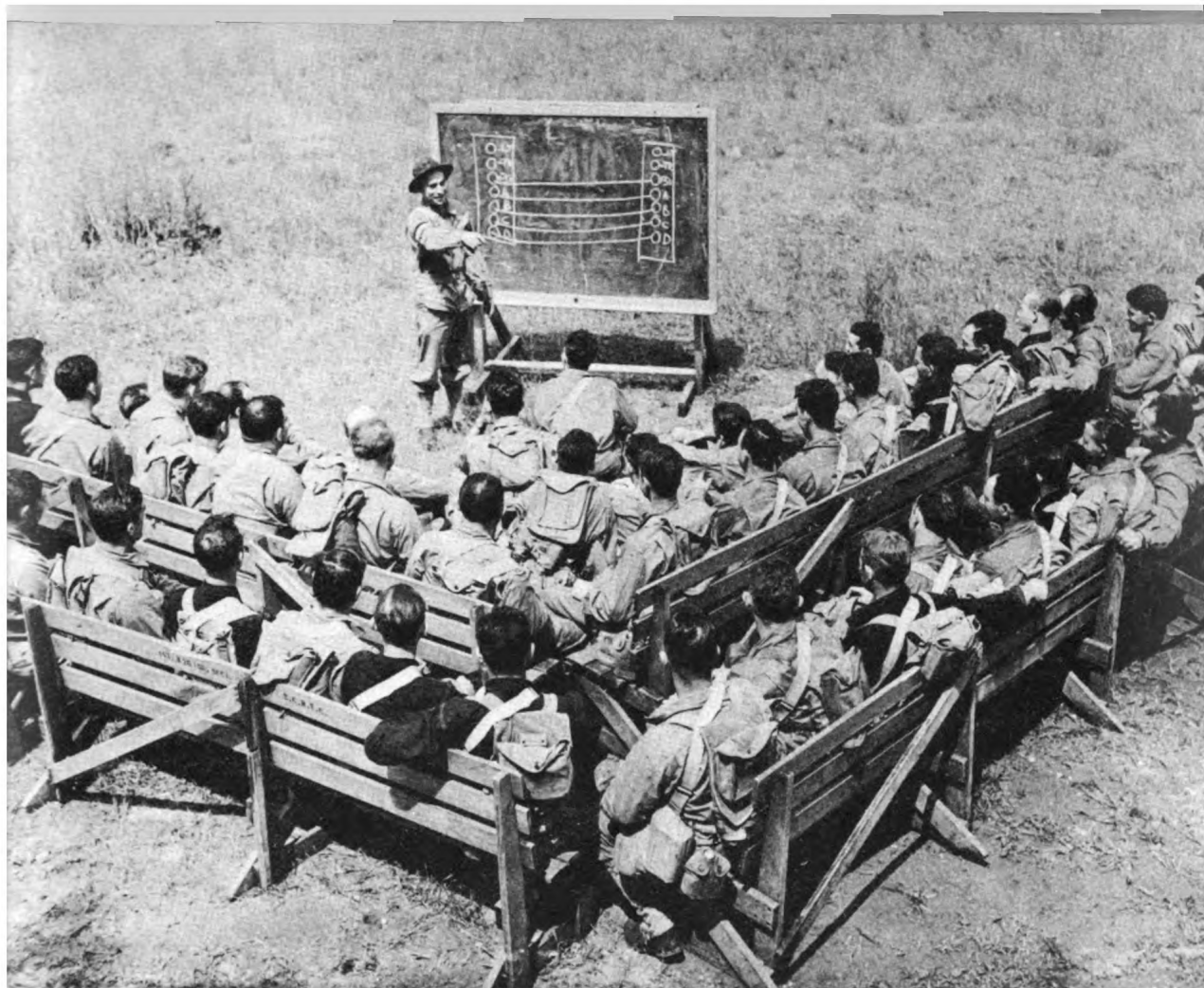
In August, 1861, the first joint Army-Navy expedition was undertaken against Confederate coast defenses, in which General Butler captured the forts at Hatteras Inlet, North Carolina. A signal party aided in directing the landing of the troops and the bombardment of the shore positions. In the expedition against Port Royal, South Carolina, in November, 1861, signal flags were again used to good advantage. The Union Navy now adopted the Myer code.

The field telegraph train requested by Myer was delivered to the War Department in January, 1862, and was accepted after tests by a board. Lack of skilled operators and difficulty in transporting batteries were the chief impediments to its use. In May, this train was brought to McClellan's army on the Peninsula. The train consisted of a light inclosed wagon carrying instruments and ten miles of insulated wire. A hand-operated magneto generator was substituted for wet cells as a source of power. On account of the scarcity of Morse operators, an indicating instrument invented by a Mr. G. W. Beardslee was introduced. The instrument, by means of turning a crank, would indicate the letter desired on the opposite end of the wire, but it did not work satisfactorily.

The first practical use of the field telegraph was made on May 24, 1862, when a line was extended several miles from McClellan's headquarters near Williamsburg to General Stoneman's advance guard headquarters at Mechanicsville. Successful experiments were made in transmitting messages while the wire was being reeled out.

A silk balloon was completed in August, 1861, and used for observations in and near Washington. The next winter several balloons were constructed. In the Peninsula campaign balloons were used almost daily, being out of range of hostile artillery at a height of one thousand feet when near the front lines. Seven wagons were able to transport four balloons and accessories.

The time of inflation was about three hours. The smaller balloons could ascend with only one passenger, who was usually the civilian aeronaut, but his reports did not seem to bring out the information which a trained military observer would have noted. Larger balloons carried two passengers. Six balloons were on hand by the close of 1862. A code of special balloon signals was prepared. Numbers were sometimes placed on the map by which to designate points on the ground. On one occasion in the Peninsula campaign a balloon at an elevation of 1,000 feet was towed by a steamer on the James



An outdoor class in line construction gets some theory. Later they will climb poles, install insulators on cross-arms, and handle the wire. The same instructor will be on hand to see that it's done right. The Signal Corps calls it the "Applicatory Method." First the instructor tells you, then he draws a picture, and later stands peering over the shoulder while you do the job yourself.

River while the river banks and surrounding country were being examined.

During Burnside's Fredericksburg campaign valuable balloon observations were also made. The chief aeronaut in charge of this service was Mr. T. C. S. Lowe, who resigned in May, 1863, following disagreements with the chief engineer of the Army of the Potomac, under whose orders he had been placed. Little use was made of balloons after Lowe's resignation. During the year 1862 experimental work was carried on with rockets, fires, telescopes, signal pistols, dischargers, telegraph instruments and insulated wire.

During the Union Army's withdrawal after the Chancellorsville campaign, the general disorganization of the Union forces and the damage done to the pontoons by a freshet caused visual communication between the two sides of the stream to be of the utmost importance. The Union forces also found its signal units doing important communications work through the battle of Gettysburg. The occupation of Little Round Top by Union forces, which prevented the success of the Confederate flanking movement, is credited to the recommendation of General Warren, chief engineer officer. The latter, in a letter written after the war, states that he was sent on July 2 to the left of the Union line by General Meade to examine conditions. Captain Hall, the signal officer on Little Round Top, had discovered the enemy massing upon Sickles' flank and had signaled information to that effect at 3:30 P.M. Hall's message was probably responsible for Warren's reconnaissance. The latter says that when he reached Little Round Top there were no troops on it except the Union signal detail. Warren recognized that it was the key to the situation. The Confederates were then advancing upon it and, to give them the impression that the hill was occupied, Warren directed Hall to keep waving his signal flags. Col. E. P. Alexander, then of the Confederate artillery, says: "That wretched little signal station upon Round Top that day caused one of our

divisions to lose over two hours and probably delayed our assault nearly that long." During that time a Federal corps arrived near the hill and prevented the Confederates from occupying it.

The Act of March 3, 1863, provided for a separate Signal Corps during the war. A central board was convened to examine applicants for commission in the Corps. In July, 1863, instruction in military signaling and telegraphy commenced at the Military Academy at West Point, under Captain Cushing. Cadets that year were able to read messages sent by flag or torch from Newburgh, eight miles distant.

In November, 1863, says the War Department's official record, "following a disagreement with Secretary Stanton over the control of the military telegraph lines, Colonel Myer was peremptorily relieved from duty as Chief Signal Officer of the Army." However, Major Myer saw the organization he had started grow in importance to the Army. The following year, in August, Army signal officers were taken on board Farragut's ships, with orders to stay below deck until the enemy's forts were passed, when they would be needed to communicate with the Union land forces.

However, it soon became necessary for the Union ships to exchange signals and the Army signal officers were pressed into service. On the sudden sinking of the monitor *Tecumseh*, the Signal Corps officer on the *Brooklyn* signaled to the flagship *Hartford*, "Our best monitor is sunk"; to which Admiral Farragut replied, "Go on." Following the engagement Farragut reported: "It gives me great pleasure at all times to bear testimony to the efficiency of the Army Signal Corps, particularly to the skill and attention to duty of its members who have been stationed . . . under my immediate eye."

Major Myer had established the first signal office of the War Department in November, 1861, at 158 F Street, N.W., in Washington. A storeroom and testing laboratory were maintained there.



Signal Corps trainees experience no lost motion performing such heavy assignments as stacking cable by hand at Fort Monmouth Training Center. While they give close attention in the classroom, this mechanical stacker does the heavy work.

In March, 1862, the office had become permanent. The first order issued from it, on March 22, 1862, had appointed a board of officers to inspect articles of signal equipment. Two civilian clerks were authorized by Congress early in 1863. From that date on, the records were arranged systematically and the Office of the Chief Signal Officer became virtually a bureau office.

"The performance of the Signal Corps," says the War Department's historical record, "was creditable in the highest degree. It started with no background of experience, equipment or personnel, and like every attempted improvement in the existing order, was compelled to struggle against ignorance and prejudice. To the indomitable courage, persistence and genius of Albert J. Myer, the father of the Corps, is due the greater part of the credit for the excellent services rendered by 'Signals' to the Union cause."

In August, 1867, by direction of the President, Colonel Myer again assumed office as Chief Signal Officer of the Army.

In 1870 the instruction camp at Fort Greble was transferred to Fort Whipple (now Fort Myer), Virginia. A new and important branch of work was now to be taken up and widely developed by the Signal Corps. A joint resolution of Congress, approved February 9, 1870, authorized and required the Secretary of War "to provide for taking meteorological observations at military stations in the interior of the Continent and at other points in the States and Territories, and for giving notice on the northern lakes and on the sea coast by magnetic telegraph and marine signaling of the approach and force of storms." This was the first attempt to organize a meteorological observing and forecasting service on a national scale. There was little American experience or data to build upon, and the office and men who instituted and developed this service were pioneers in the field.

One observer-sergeant was sent out in October, 1870, to each of 25 stations, from the Mississippi valley to the Atlantic and Gulf

coasts. The following month the first systematized synchronous meteoric reports were made by observer-sergeants at 24 stations. These were delivered in all Eastern cities within one and a half hours. Meteoric charts and weather maps and bulletins were published.

The training of officers and men for meteorological work was made a function of the Signal Corps School at Fort Whipple. The exchange of meteorological reports was commenced with Canadian stations in 1871 and extended to the West Indies the next year. By July, 1873, reports were regularly received from 93 observation stations, of which 78 were within the United States. At this period there were being distributed a tri-daily, *Synopsis and Probabilities*, a daily bulletin to 9,000 post offices, and a weekly "Weather Chronicle."

A system for reporting by telegraph the rise and fall of important river waters was instituted in 1873. By the following year the chain of observation stations extended from Halifax to the Barbados. Special weather bulletins were now being published for the information of farmers.

The construction of Signal Corps telegraph lines was commenced in Texas, Indian Territory, Arizona and southern California. It became the policy of the Corps to link up the frontier posts and settlements by telegraph, discontinuing service as the commercial companies gradually extended their systems. At the peak of this service, about 1880, the Corps was operating over 5,000 miles of telegraph line, constructed and maintained by its own personnel.

One of the longest systems connected San Diego and El Paso, with branch lines from Maricopa Wells to Prescott, Arizona, and from Las Cruces to Albuquerque and Santa Fe, New Mexico. The Texas system centered at Fort Concho, from which one line ran northeast to Fort Sill, Oklahoma, and Dennison, Texas; one west to Fort Davis; and one south to San Antonio, Eagle Pass, Laredo

and Brownsville. In the Northwest a system connected Bismarck, North Dakota, with Fort Ellis, Montana, via the Missouri and Yellowstone rivers. The river crossing at Forts Sully and Bennett, South Dakota, was a single span 2,500 feet long.

A permanent Signal Corps enlisted personnel was provided by the Act of March 3, 1875, authorizing 150 sergeants, 30 corporals, and 270 privates. All recruits were required to pass a preliminary educational examination and were promoted and assigned only after instruction and examination at Fort Whipple. Observer-sergeants were also trained in Morse telegraphy.

General Myer died at Buffalo, New York, August 24, 1880, at the age of fifty-two. He was succeeded by Brigadier General William B. Hazen. The administration of General Hazen is noted principally for the Arctic expeditions. These expeditions were the result of international polar conferences held at Hamburg and Berne in 1879 and 1880. The Arctic explorations during this period constitute a separate and distinguished page of our nation's history and have been reported in excellent books by the men who made them.

As was to be expected, the overshadowing importance of meteorological activities had retarded the development of signal apparatus and methods. The most important signal instrument actually developed by the Signal Corps during this period was the heliograph. Flashes were read at Fort Whipple in 1877, up to thirty miles. Gradual improvements in design were made, and three heliograph detachments were sent to General Miles for use in Indian campaigns in Arizona in 1885 and 1886. Miles says in his report: "The reports of Lieutenants Drave and Fuller show the working of the most interesting and valuable heliograph system ever established." General Hazen died January 16, 1887, at the age of fifty-six. Captain Adolphus W. Greely was nominated on February 16, 1887, to be Chief Signal Officer with the rank of brigadier general.

In 1886, the Continental (International Morse) code succeeded



Realistic battle training. Men of this gun crew wait for firing orders from officer communicating with his command post through Walkie-Talkie.

These students are learning the Morse Code. The same men at this table may one day flash orders involving movements and actions of thousands of men in theatres of combat.



the Myer code for general Army use. Three years later the American Morse code was substituted. Later, in 1896, the Myer code was again adopted and remained the official code until 1912, when the International Morse was once more prescribed.

The use of balloons, which had been abandoned since the Civil War, was again resumed in the early nineties. A military balloon, fabricated under supervision of Captain W. A. Glassford, was exhibited at the Chicago Exposition in 1893. In 1896, a model balloon section was organized at Fort Logan, Colorado. It included a silk balloon of 14,000 cubic feet capacity, a balloon wagon with drum, four tube wagons, one service wagon, and a gas generator and compressor.

The year 1898 witnessed the temporary expansion of the Signal Corps from 8 officers and 50 enlisted men to a total strength of more than 1,300. Early plans were made for signal communications for a campaign against Havana. These plans were rearranged when it was decided to move against Santiago. Colonel James Allen acted as chief signal officer of the expedition. The steamship *Adria* was fitted with cable gear and carried 45 miles of submarine cable, all that could be obtained. On arriving off Santiago on June 1, the first task was to grapple and cut the cables landing there, which were operated by a French company. One cable was finally raised and cut under the fire of the Spanish batteries in Morro castle.

After the landing and the subsequent attack on July 1, each division under a separate commander was assigned two signalmen. The telegraph line was extended forward as the troops advanced, and on July 3 was carried to San Juan Hill and the center of the American trenches. Telegraph lines were installed connecting all headquarters of the various units and were maintained until the surrender of Santiago on July 17, when the Spanish telegraph line was tapped, extended into corps headquarters and communication opened.

One balloon with its accessories was taken from Tampa to San-



Camouflaged by natural foliage this reconnaissance car and crew are keeping an eye out for enemy troop movements. The radio antenna sticking up at the center will catch the signal when headquarters is ready for the armored car and observers to move up.

tiago on a transport. Carboys of sulphuric acid for use in generating the hydrogen gas used in the balloon were brought along. Three ascensions were made on the afternoon of July 30. The Spanish fleet was plainly visible in the harbor and an increasing knowledge of the terrain was gained. On the following day an ascent was made at the front near El Pozo, the chief engineer officer being a passenger. The balloon was then carried forward across the San Juan River, but soon after being raised at this point it was struck several times by small arms fire. Facilities for repairs on a large scale being absent, no further use of this balloon was made.

"A military censorship was exercised by the Chief Signal Officer," says the War Department record. "It extended over all cables from the United States to foreign countries, the land lines of Florida, and the foreign-owned cables landing in Cuba. The Western Union Telegraph Company placed its counsel, skill, and aid at the free disposal of the Government. Foreign cable companies generally accepted the censorship in good spirit. A rich harvest of information was reaped from commercial and personal messages passing over the lines controlled by the Signal Corps. The orders issued by the President and Secretary of the Navy for the blockading of Cervera's squadron in Santiago harbor were based on reports and representations made to them in person by General Greely, the Chief Signal Officer. Cipher reports of information collected were received at Washington from Colonel Allen almost daily," says the record. Evidently this was the first censorship and also the first organization of an Intelligence Service on a war scale.

With the first expedition to Manila in 1898, a new and difficult chapter of Signal Corps activities was commenced. Thirteen officers and 116 enlisted men were disembarked at Cavite July 31. These were organized into the 1st and 18th Signal Companies, from which the 19th was later formed. A cable was laid between Cavite and the American lines around Manila. Communication was maintained

between the commanding general and the headquarters of his detached commands and depots.

As our army moved forward, the Signal Corps carried lines into the most advanced trenches. In the final assault on the defenses of Manila, on August 13, a field telegraph line was laid under fire to an advanced station. The red and white signal flags were the first American emblems within the Spanish entrenchments.

Upon the conclusion of the Spanish-American War the Signal Corps found its duties greatly extended. In Cuba, Puerto Rico and the Philippines, telegraph and cable systems were to be constructed. Alaska was soon to become an important scene of operations. New and improved methods of electrical signal communications were about to be developed. Fire-control equipment for the fixed and mobile artillery had to be designed. Manuals for the various new methods and instruments had to be prepared. Finally, through the vision and energy of successive chief signal officers, military aviation was to be introduced into the American Army.

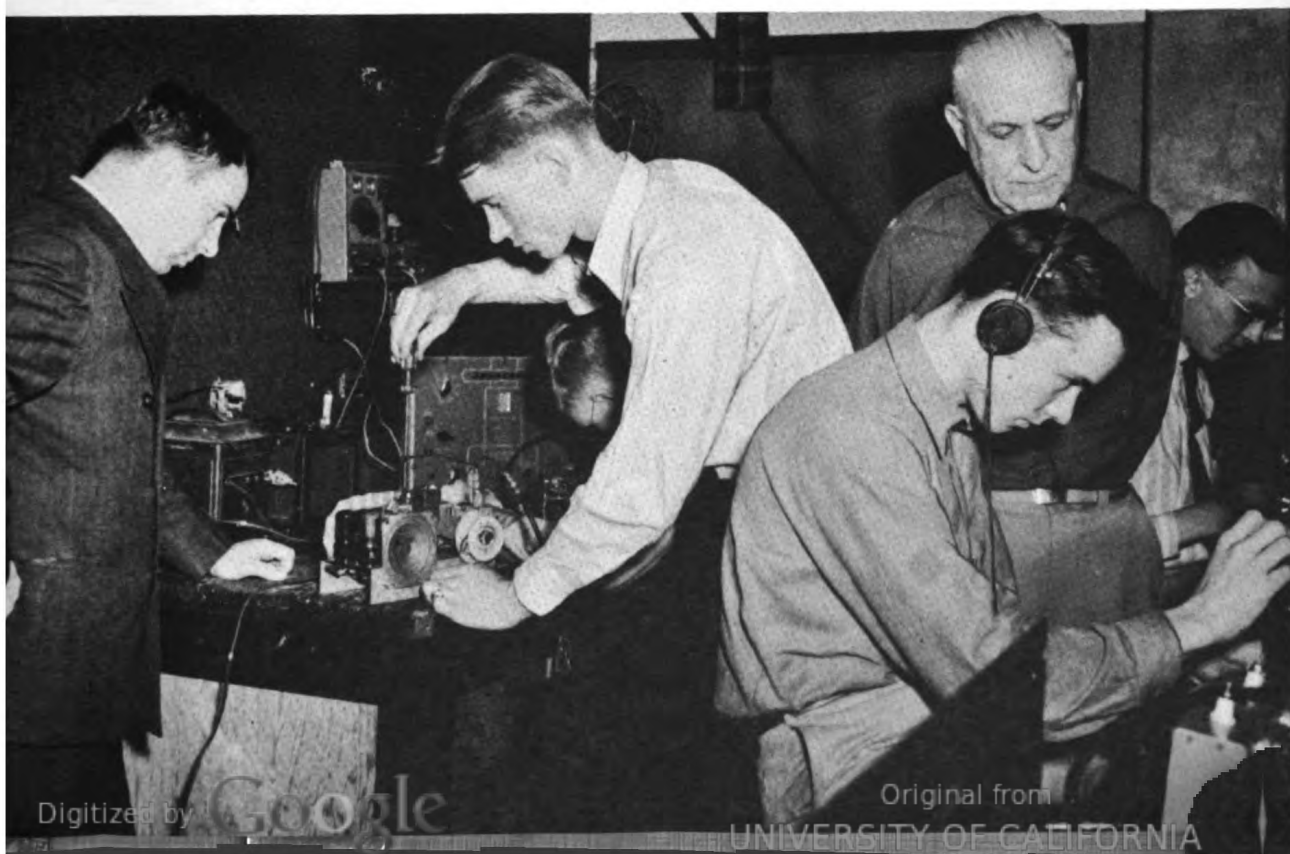
Upon the outbreak of the Philippine insurrection in February, 1899, small detachments of Signal Corps men performed arduous duties in the field. Major General Arthur MacArthur, commanding the American forces in the islands, said: "As a means of tactical control, wire service in the hands of trained, skillful and fearless men may be regarded as an indispensable adjunct of modern war, in which light it is a great privilege to speak in behalf of the future development of the Signal Corps in the regular establishment to the full limit of essential military usefulness."

The first cable ship to be sent to the Philippines from the United States, the *Hooker*, was wrecked off Corregidor in 1899, a few weeks after her arrival. A considerable amount of the rubber-insulated cable was recovered and repaired, and 150 miles were laid that year by Captain Maxfield, connecting Leyte, Cebu and Samar. Several



Complicated-looking instruments such as this are used to teach rookie Signal Corps soldiers the elements of electricity and modern radio.

Students under watchful eyes of both civilian and officer instructors dismantle radios down to the last screw to see why they work. Individual teaching methods of Signal Corps schools gives students opportunity to learn fast.



lines were also laid along the Luzon coast, connecting points between which overland communication was impracticable.

General MacArthur approved a comprehensive scheme for a cable and telegraph system which would connect his headquarters with all important garrisons in the islands. Cable for this purpose was manufactured in New York. The transport *Burnside* was fitted out as a cable ship and carried the cable and gear to Manila in the fall of 1900, Captain George O. Squier being in charge. The laying of the cable commenced in December of that year under direction of Captains Squier and Russel. The first cables were laid between Negores and Mindanao, along the coast of Mindanao, between Mindanao and Jolo, and between Cebu and Negores. This placed the most important of the southern islands in direct communication with Manila. The work was carried on in poorly charted seas with irregular bottoms and strong currents. At one point a depth of over one mile was reached. Several repairs of existing cables were made and by July 1, 1902, over 1,300 miles were in operation. The sixteen most important islands were eventually connected by cable.

On short cables up to 150 miles in length, an open-circuit Morse system with polarized relays was used. Among the causes of cable trouble were included chafing on coral reefs, lightning striking the cable box, and in one instance a shark's bite, the teeth being found embedded in the defective piece. The cable ship *Liscum* replaced the *Burnside* in 1905, and the Signal Corps continued cable maintenance until 1909.

The Act of May 26, 1900, provided for an extensive system of military telegraph and cable lines in Alaska. Major Frank Greene was assigned as the first signal officer of that department. Short sections were completed in 1900, and a connection with the Canadian telegraphs was made on the Yukon between Fort Egbert and Dawson in September, 1901. By July, 1902, six of the seven

sections of land line had been completed and the following year saw the completion of the project with a total of 1,740 miles of wire.

While the men worked in Alaska the cold reached 72 degrees below zero in winter, while in summer hordes of mosquitoes drove the working parties nearly insane. "The toil and hardships experienced by these and all other working parties—enlisted men of the line, the Signal Corps and civilian employees—cannot be fairly appreciated by anyone unfamiliar with Alaskan trails," the Chief Signal Officer in charge reported. "Suffice it to say that every pound of food, forage, tentage, wire insulators, or line material has to be moved by pack animals over a trail so rough that an animal can hardly travel 15 miles a day. Cold and rapid glacial streams, swampy morasses, tangled underbrush, steep declivities, narrow canyons, thick timber, and sharp ridges alternate to tax the strength of man and animal to the utmost. The monotony of the life is exceedingly trying after the novelty of scenery disappears. When to these conditions are added the physical discomforts attendant on frequent falls of rain in summer and of snow in winter, with high, cutting winds, it requires firmness of purpose to persevere to the end. Certain it is that no body of men in Alaska render more faithful and valuable service to the country than do the enlisted men of the Army, especially on the telegraph trails."

After the completion of the land system, the task of repair and maintenance was by no means easy. Forest fires were the main cause of line damage. It was necessary to furnish every telegraph station with food and other supplies for at least one year in advance. Supplies were regularly transported by dog sleds in winter, and in summer emergencies by pack animals, except that stations on the Yukon and Tanana rivers were supplied by boat in summer. Repair parties were stationed in log cabins about forty miles apart, each party consisting of three men, with rations for a year. The devotion

and fortitude of the Signal Corps personnel was equaled by that of officers and men of line who assisted in construction and maintenance.

An appropriation was made in March, 1903, for a cable from Seattle to Sitka. This was the longest cable ever manufactured in America. It was fabricated by the Safety Insulated Wire and Cable Company of Bayonne, New Jersey, which had also built shorter cables for use in Philippine waters. Instead of the British type of gutta-percha cable, a seamless rubber cable was produced. It was less expensive than the gutta-percha type and was less subject to injury in transportation and from exposure to high temperatures. The first section of the cable was brought around Cape Horn in the summer of 1903. That same year radio stations were installed by Captain L. D. Wildman at Safety Harbor and St. Michael, providing communication across Norton Sound, a distance of 107 miles.

The route between Seattle and Sitka was surveyed by the Coast and Geodetic Survey. Colonel James Allen was in charge of laying the cable, assisted by Captain Edgar Russel, who drew the specifications. Cable laying was started in Alaska from the *Burnside* in the fall of 1903. Juneau and Sitka were connected and 600 miles laid at sea, going south from Sitka. The sea end was buoyed for the winter. It was several months before the *Burnside* could resume operations and in the meantime the buoyed end was washed away. It was necessary to recover and relay this section of 600 miles. However, the Sitka-Seattle branch, 1,070 miles long, was completed in August, 1904. A section from Sitka to Valdez was installed that fall. In 1905 an appropriation was made to extend the cable from Valdez to the terminus of the Alaska Central Railroad at Seward. Two hundred twenty-three miles of cable was transported overland to Seattle. Completed in Bayonne on May 23, it was opened for traffic on August 3. In 1906, the Seattle-Sitka line was duplexed.



Thousands of hours of "Instruction" are stacked here. Students at Monmouth will eventually mount each of these cross-arms on a pole, and later wire.

Although the original operation of this cable was quite satisfactory, the deterioration peculiar to rubber-covered cable commenced to be noticed after a few years. Repairs were made on it by the *Burnside* in 1907. In 1908-09, a cable was laid from Montagne Island to Cordova and thence to the naval station at Point Whited. This pioneer work of the Signal Corps in the Alaskan area leaves a brilliant mark in the Signal Corps history. Today many of those same communications lines have figured prominently in recent installations which have been set up to forestall the advance of the Japanese across the Aleutians.

In the late nineties, the Signal Corps had turned its attention to radio with a view to adopting it for military use as soon as the progress of the science would warrant. In 1899 there was instituted by signal officers between Fire Island light ship 12 miles out and the shore the first radio communication regularly and publicly operated in America. Arrangements were made for experimental work in connection with engineers of the Marconi Company. Among the pioneers in the field of military radio research were Colonel James Allen and Captains George O. Squier, Edgar Russel and Samuel Reber. In 1900, a radio system was installed in San Francisco harbor and worked successfully by Signal Corps enlisted operators. The possibility of earth telegraphy for short distances was demonstrated by Captain Russel in 1902, when he maintained communication between stations separated 1½ miles, using 200 or 300 feet of wire at each station, with both ends grounded. The DeForest, Fessenden and Marconi systems of radio telegraphy were tested by the Signal Corps in 1902. The Fessenden system was installed in Alaska in 1903, but the efforts to establish the Marconi system were ineffective. In 1903, the Chief Signal Officer attended the International Wireless Conference in Berlin.

About this time reliable communication was obtained between

Forts Schuyler and H. G. Wright, New York, a distance of 97 miles, with modified DeForest system. The design of 1- and 3-kw ship and land sets, a 600-watt portable gasoline-driven set, and a 125-watt pack set was begun in 1905. The 1-kw set was adopted for coast artillery harbor service. In Cuba, in 1906-08, the pack set was used over a working range of 20 miles. Radio sections or platoons were now organized in field companies. In 1907-08, wagon and pack sets were put in service in the Philippines. The Chief Signal Officer acted as adviser to the Cuban Department of Commerce in matters relating to radio installation during the occupation of the Army of Pacification.

In 1908, there were in operation the following permanent Signal Corps station sets, ranging in power from $\frac{3}{4}$ to 10 kw: six in the United States, eight in Alaska, one in Cuba, two in the Philippines and five on Army transports.

After this, development was rapid. Experimental work in radio telephone commenced in 1907. The first experiments were with transmitters inserted in the antenna circuit. Experiments in the generation of continuous wave were begun at the same time. In 1912, a new pack set was designed, with high frequency quenched-gap transmitter and hand generator. Successful radio telegraph messages were sent that year from airplane to ground. The first motor-driven tractor set (2-kw) was tested successfully in June, 1914. Valuable cooperation was obtained from the Bureau of Standards, which placed laboratory facilities at the disposal of the Signal Corps.

New types of combat transportation were made necessary by the development of signal equipment. In 1907, this transportation consisted of automatic reel carts and pintle-type wire wagons, lance trucks, instrument and construction wagons, and boxes and chests for pack transportation. The Quartermaster Corps escort wagon was largely used until the introduction of the motor truck.

As the men of the Signal Corps began to find success with the



This hand cart carries a reel of wire and when towed by one or two men will string the wire across fields or hillsides where motor vehicles cannot be used.
Here a student is servicing the cart while instructor watches.

newer radio developments of the early 1900's they once more looked with interest at their records of previous balloon operations which had been temporarily laid aside, since the balloons of the Civil and Spanish-American War had not been too successful. Now with radio and telephone coming of age, these Signal Corps officers saw new needs for faster communications. So in 1905-06, the Signal Corps Equipment Board, desiring to be able to generate hydrogen gas in large quantities, tested or inspected the following processes: refrigeration of illuminating gas; regeneration of steam and iron, water electrolysis; sulphuric acid and iron. In 1906, a captive balloon of a capacity of 7,750 cubic feet was purchased. Several smaller ones were already on hand. A spherical balloon filled with coal gas made a voyage of 104 miles in 1906. A balloon detachment of ten enlisted men was on duty at the international race starting from St. Louis in 1907. A Signal Corps officer in this race covered 720 miles in 39½ hours. A small dirigible was purchased in 1908. That year a steel balloon shed, a hydrogen generating plant (water electrolysis), and a storage tank for 50,000 cubic feet of hydrogen were available at Fort Omaha. One dirigible and three small captive balloons continued to be our lighter-than-air equipment.

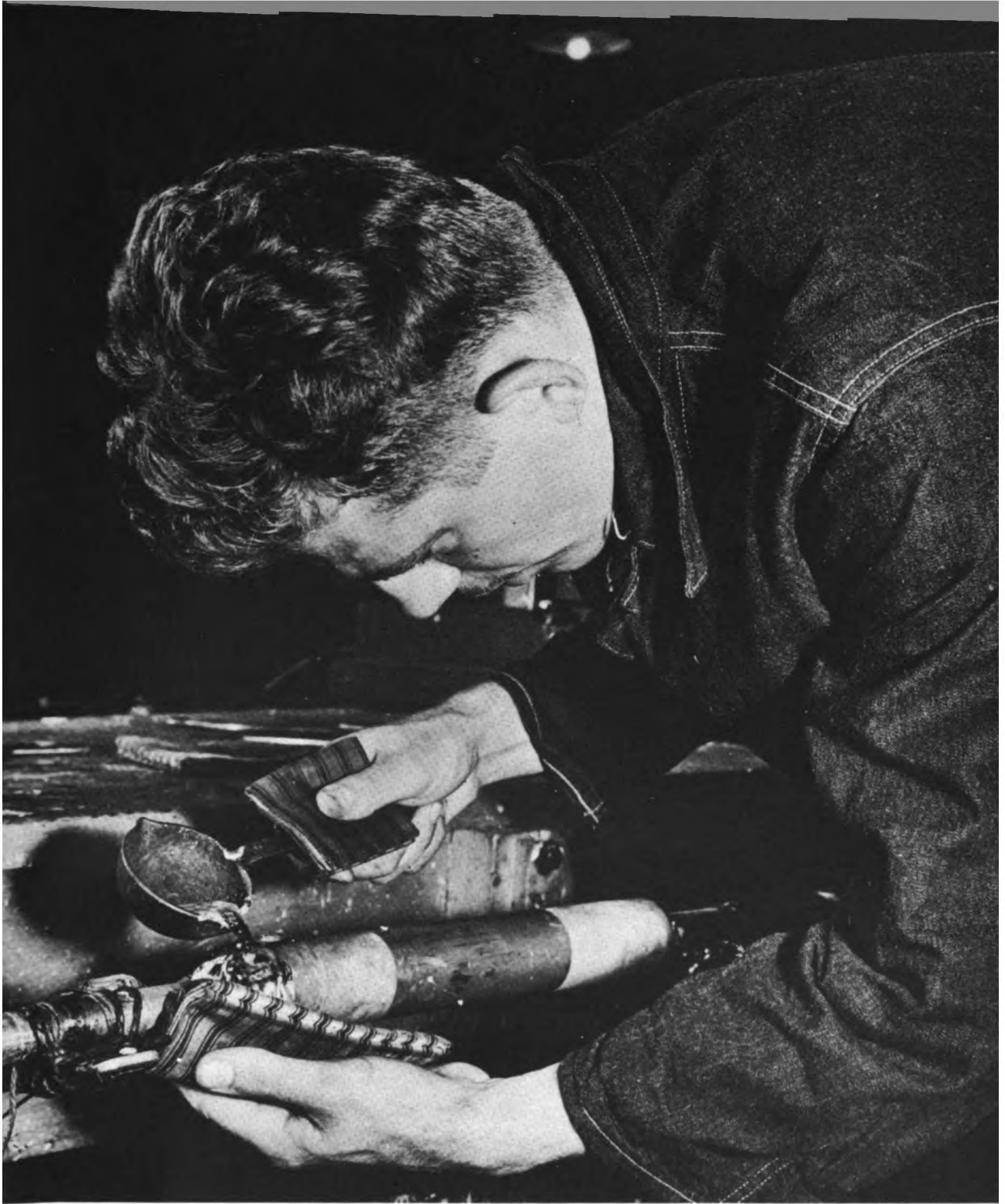
In December, 1907, specifications were prepared and proposals invited for a heavier-than-air machine, speed 40 miles per hour, to remain in the air one hour and to be at all times under control. Contracts were awarded to the Wright brothers and to A. M. Herring. The first Army officer to be killed in an airplane accident was First Lieutenant Thomas E. Selfridge, Field Artillery (attached to Signal Corps), who lost his life at Fort Myer, September 17, 1908. Orville Wright was severely injured at the same time. Tests with the Wright plane continued during 1908 and 1909.

In 1909, after reviewing the rapid progress of European aviation, the Chief Signal Officer (General Allen) said: "All first-class powers

except the United States are providing themselves systematically with aerial fleets—it is believed that a systematic plan of development of this military auxiliary for national defense should be inaugurated without delay.” In each subsequent year General Allen and his successor, General Scriven, continued to point out our lamentable deficiency in air equipment. In 1912, an appropriation of \$125,000 was made for the purchase, operation and maintenance of airplanes.

In June, 1911, the first Army aviation school had been opened at College Park, Maryland, just outside of Washington, D. C. During the winter it moved to Augusta, Georgia. Five airplanes were available that year and six officers qualified as pilots. The War Department was unable, however, to detail the necessary officers for instruction. In 1912, an automatic machine gun was fired from a plane and aerial photographs were taken. Aerial observation of artillery fire was conducted at Fort Riley, Kansas, using radio communications to the ground. Three airplanes participated in summer maneuvers in Connecticut. Qualification tests for military aviators were prescribed. It was decided to develop two types—a scout and a speed scout, the latter a one-passenger machine with a speed of 65 m.p.h. and a radius of operation of 100 miles. In November, 1912, there were 12 planes at College Park, and 12 officers and 39 enlisted men on aviation duty. There had been six fatalities up to that time, including four officers.

In 1912, a school for hydro-airplane instruction was opened at San Diego, California. In the winter of 1912-13, the Augusta air school was transferred to Texas City, Georgia, to participate in exercises with a division of mobile troops. A new American cross-country and endurance record for two-passenger machines was made by Army pilots in March, 1913, flying from Texas City to San Antonio (240 miles) and return in a Burgess tractor, with no intermediate stops. Atmospheric conditions were unfavorable at Texas



There is an art to "wiping" a joint. This trainee has spliced a cable and is adding finishing strokes. The connection must be perfect job before instructor classes him qualified for field assignment.

City, and the schools there and at College Park were transferred to San Diego in June, 1913.

At this time two airplanes were sent to the Philippines and two to Hawaii. Bomb dropping was first tried in 1913. In that year the Chief Signal Officer recommended the creation of a flying center at Fort Sam Houston and the establishment of an aviation reserve corps. Four officers were killed at San Diego in the eight months ending in February, 1914.

The Act of July 18, 1914, authorized an Aviation Section of the Signal Corps to consist of 60 officers and 260 enlisted men. Increased pay was granted to aviators. Only unmarried lieutenants below the age of 30 years could be detailed. In October, 1914, 24 officers and 115 enlisted men were on duty in this section. In July, 1915, 20 officers had been rated as junior military aviators.

The available air resources of the Army were put at the disposal of the punitive expedition in Mexico in 1916. The high altitude and dry atmosphere caused propeller difficulties which for a while nullified the operations. The few machines on hand were rapidly spent.

The National Defense Act of 1916 reorganized the Aviation Section of the Signal Corps to consist of one colonel, one lieutenant colonel, 8 majors, 24 captains, and 141 first lieutenants to be selected from officers of other branches of corresponding grade or of the next lower grade. Details were to be for four years. The rating of junior military aviator was authorized, subject to qualification, and the rating of military aviator after three years' service as junior military aviator. Increased pay was given to all officers on flight duty, and in addition for junior military aviator and military aviator ratings. Rated lieutenants also received an increase of one grade. An Advisory Committee for Aeronautics and an Aviation Section of the Signal Corps Reserve Corps were created. The separation of all air

During field problems all types of radio equipment are used while on the move. This Signal Corps soldier operates Handie-Talkie as he hikes.



service activities from the Signal Corps did not come until May, 1918. During our nineteen months of war the strength of the Signal Corps (exclusive of the Aviation) increased from 55 officers and 1,570 enlisted men to 2,712 officers and 53,277 men.

Thus two instruments developed by the Signal Corps for military use—the radio and airplane—during World War I have in World War II become the juggernauts of military history. Decisions effected by these instruments will be verdicts of the outcome. The dynamic history begun by the Signal Corps in the first World War cannot be evaluated until World War II is ended.

THE SIGNAL CORPS LOOKS AHEAD

IN THE FIRST WORLD WAR the Signal Corps nurtured the two sciences, aeronautics and radio, through their toddling stage. After the Armistice, during the interim of peace, these two instruments became the greatest boons to mankind, bringing happiness and contentment to millions. It was not the Signal Corps alone which invented these instruments, but rather the farsighted officers of the corps working side by side with scientists, manufacturers, and leaders of communications and aviation industries during those years up to 1917, which brought radio and airplane into their first useful stages. Then, with the war, the Signal Corps took the lead in development of them and making them practical weapons which we could use to win the victory. After the last war was won there was no branch of the service more ready to cooperate and harness these wonders of the twentieth century to the needs of a nation at peace. Thus, as the Signal Corps looks ahead, there is sound reason to believe the Signal Corps will once more place at the disposal of millions of peoples in a world without war the comforts and magical sources of enjoyment which can be obtained from the many new instruments, now secret, which are being adapted to war.

Most of the officers of the Signal Corps are astonished at the rapid strides made in the field of electronics. They foresee almost unlimited possibilities for making free men still more independent of the bonds that now bind us in the field of science. Electronics

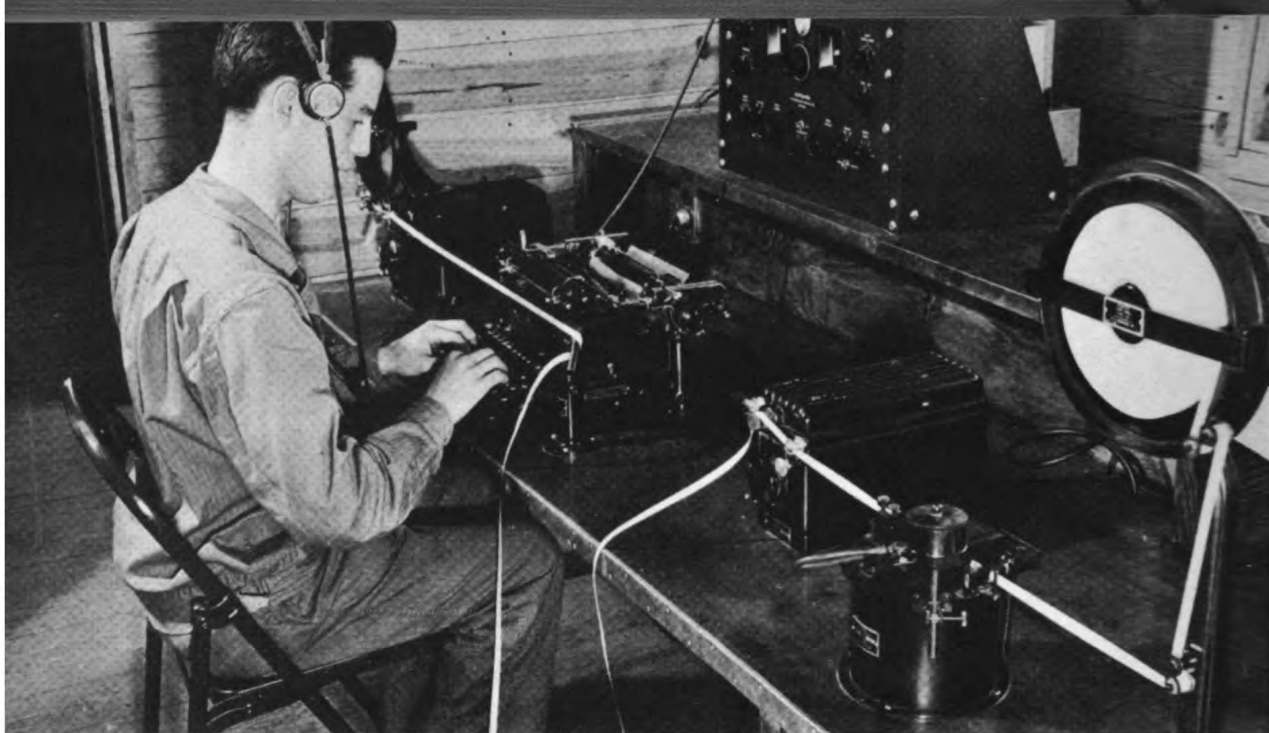
is a broad, all-inclusive term. Already its branches have extended in so many directions that when one gets off on the startling story of any one recent development he finds that he is far out on a trail that is only one of many.

There are a few of these electronic devices familiar to us, those we have already come to know and which we had before war came. Chief among these is television. What its possibilities are and the effect it will have on everyday living is yet only the wildest speculation. We have been told that it is ready for peacetime living but is being held up until the most has been made of it to win the war.

Some of the products of the field of electronics include the talking movie, brought to life by the magic of the photoelectric cell. Then there is the electric eye, which opens a door for you as you approach, without your making the slightest movement of a muscle to help. Doctors now take us in tow at the hospital and shove us under the most powerful of X-ray machines which see into and through every tissue of the human body. Another medical aid is the fluorescent lamp. There are photoelectrical needles, surgical instruments of perhaps a dozen different types; lights that peer into the throat and roast disease germs alive. There are giant telescopes, aided by electronic devices, that give millions of miles to the vision of the astronomer and open an entirely new field for him in heavens too far away to imagine.

Then there are microscopes with electronic attachments which magnify a microbe millions of times. Some of these instruments are just now getting to the practical stage. Perhaps with them the surgeon will be able to unlock all of the secrets of disease in the human body and eventually set the world's millions free from the scourges of the body.

Electronic devices now are practical in the counting of votes at the ballot box. They show favoritism neither to the Democrat nor the Republican, but are strictly non-partisan. Electronic tubes auto-



Army Message Centers now can handle heavy wire traffic loads. Recorded on an automatic tape as they pour in, these coded messages can be transcribed later as more urgent messages with priority rating are received and dispatched. This student practices reading from automatic tape recorder. He can speed machine up at will.

This class of teletypewriter maintenance men is watching the wheels go round. Before completing the course these men with screwdrivers, pliers and other tools will take these instruments apart piece by piece and re-assemble them. What's more, they'll work.



matically write the statistical data of the performance of a pursuit plane as it darts downward at 600 miles an hour. Blind-landing devices already are working which when used by the pilot permit him to land his plane whether he can see the ground or not. The electronic gadget simply lifts the veil from the eyes of the pilot, for signals coming through his radio receiver tell him the exact moment when he should level off and touch his wheels to the ground.

Electronic instruments count automobiles going through a tunnel or over a bridge, count cans of food passing down a line in a packing house, and some devices will even separate faulty mechanical parts moving along an assembly line. When the electric eye catches the faulty piece in the beam it trips a switch and throws out the part, or else stops the apparatus until it can be removed from the moving belt.

Then there is the instrument adopted by the American Foundation for the Blind. A blind person straps the device to his chest with the receiver clamped to the ear. As he walks along, objects directly in his path break the radio beam and set up a signal in the blind person's ear. He simply stops and walks around the object, guided by his electronic seeing-eye dog. Almost hourly, news of such new discoveries is made known to the world. For instance, in a New York paper recently there was a story from the RCA laboratories at Princeton, New Jersey. It told of a radio "sewing machine" that "stitches" thermoplastics together without thread. Even the laboratory calls it a piece of magic. The story continued that the invention is expected to find wide application in the "seaming" of rain-coats, caps and weather balloons now being manufactured for the armed forces from synthetic materials. The nearest thing to thread in this sewing machine, said the story, is a radio-frequency current applied by two small roller wheels between which pass the two pieces of thin plastic to be joined.

The joining is effected by heat induced inside the materials by the

radio-frequency currents. According to the story from the laboratory, this is brought about by the "dielectric" losses in the materials, created by the struggle of the current to get through the material. The heat thus generated causes the materials to fuse or weld in a tight bond, stronger than the material itself.

Another story just released tells about other new developments made by the Signal Corps with Acme Newspictures, Inc., in the latter's laboratories at the hands of a brilliant civilian engineer, L. A. Thompson. The story says the Signal Corps is inaugurating a new radio telephoto transmission service from North Africa, which permits battle-front news pictures to be printed in American newspapers a few hours after the action takes place. The pictures can be transmitted from Africa in seven minutes. The story indicates that this device will share its picture and news service facilities by transmitting diagrams, maps, documents or orders in exact copy form. Thus each of these new devices must harness itself to war, and we must wait a while before their conveniences will be available for every home.

So, as the war progresses and the laboratories work round the clock, the Army Signal Corps is sure to come forth with accomplishments that are worthwhile, even though they are forged in the flame of war.

Paramount in the face of any eventuality, however, will be one job to which the Signal Corps will give full attention. That will be the task of "getting the message through." As the other fighting arms develop speed and flexibility, so must the Signal Corps develop speed and flexibility to meet the changes. The Army, no matter how fast any one arm moves, must still operate as a coordinated, synchronized unit, under one head, with one Commander-in-Chief. It is safe to accept and trust the pledge of the Signal Corps—it will "Get the Message Through."

RETURN TO the circulation desk of any
University of California Library
or to the
NORTHERN REGIONAL LIBRARY FACILITY
Bldg. 400, Richmond Field Station
University of California
Richmond, CA 94804-4698

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS

- 2-month loans may be renewed by calling (510) 642-6753
- 1-year loans may be recharged by bringing books to NRLF
- Renewals and recharges may be made 4 days prior to due date.

DUE AS STAMPED BELOW

MAY 19 2002

12.000 (11/95)

LD 21A-50m-8,'57
(C8481s10)476B

General Library
University of California
Berkeley

YD 00975

